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FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

ETHIOPIAN ROADS AUTHORITY

FINAL ENVIORONMENTAL AND SOCIAL IMPACT ASSESSMENT OF KONSO-YABELO ROAD PROJECT

March, 2012

FEASIBILITY STUDY, ENVIRONMENTAL IMPACT *ASSESSMENT AND DETAILED ENGINEERING DESIGN OF KONSO - YABELO ROAD UPGRADING PROJECT*

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY

FINAL UPDATE REPORT

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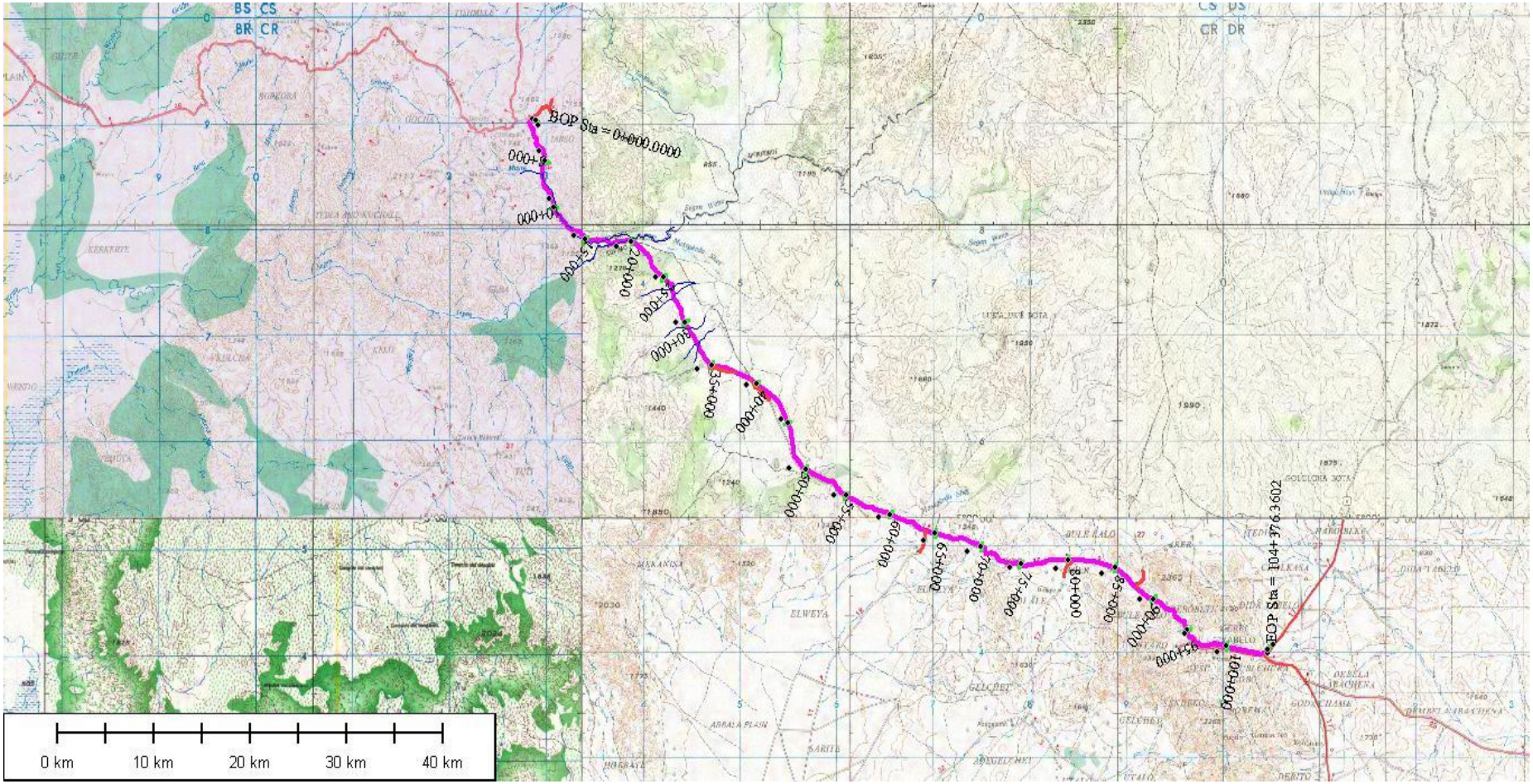
ABBREVATIONS USED IN THE TEXT

ADF	African Development Fund
AFD	Action for Development
WAO	Woreda Administration Office
CGD	Community Group Discussions
DA	Development Agency
ECMY	Evangelical Church Mekane Yesus
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMA	Ethiopian Mapping Authority
EMB	Environmental Management Branch of ERA
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
EPRDA	Ethiopia Pastoralist Research and Development Association
EPE	Environmental Policy of Ethiopia
ERA	Ethiopian Roads Authority
ESIA	Environmental and social impact assessment
FGD	Focus Group Discussion
GIS	Geographic Information System
GOE	Government of Ethiopia
IEE	Initial Environmental Examination
KA	Kebele Administration
LC	Local Community
NGO	Non Governmental Organization
PASDEP	Plan for Accelerated and Sustained Development to End Poverty
PRSP	Poverty Reduction Strategy Program
REA	Regional Environmental Agency
RFA	Road fund Administration
ROW	Right-of-way
RSDF	Road Sector Development Plan
SEIMM	Socio-economic impact mitigation management
SEPP	Southern Ethiopia Pastoralist Project
SNNP	Southern Nations, Nationalities and Peoples

SNNP	R Southern Nations, Nationalities and Peoples Region
STI	Sexually transmitted Infection
WAO	Woreda Agriculture Office
WHO	Woreda Health Office
WRDO	Woreda Rural Development Office
ZoI	Zone of Influence

LOCATION MAP



0 EXECUTIVE SUMMARY

0.1 Introduction

The Government of Ethiopia in Plan for Accelerated and Sustained Development to End Poverty (PASDEP) recognizes that environmental resources are the foundation of social and economic development as they are the sources of goods and services needed for poverty reduction and economic growth. However, environmental degradation and mismanagement of natural resources reduces the environment's ability to produce biomass for food, feed and household energy. It undermines prospects for fighting poverty and achieving sustainable development. Rapid and severe degradation can also lead to special circumstances in the society, such as migration, deterioration of the person's health condition, displacement of indigenous peoples or communities and lack of access to basic environmental services such as clean water, bio-fuel, etc. These changes put added stress on the lives of the people. Therefore, any development program and projects should work alongside a framework of growth that seeks to maximize quality of life and minimize environmental costs.

One of the major activities contributing for environmental degradation in Ethiopia is road construction. The key environmental problems associated to road construction are removal of vegetation cover from road right-of-way, borrow areas, quarry sites, camp sites and accelerating soil erosion and soil compaction. Water and soil pollution, especially by construction spoils and other related waste from construction camps and workshops are becoming serious challenges. Therefore, the need to incorporate environmental and social impact considerations during the planning and implementation phases of road projects has become a pressing issue to minimize the adverse effects on the environment.

Accordingly, ERA has entered an agreement with Renardet S.A consulting firm to revise the Konso - Yebelo road upgrading project feasibility study, environmental impact assessment and detailed design report which was conducted in 2004 by GIBB (East Africa LTD). Hence, this Paper is designed to presents an ESIA study up date report whose purpose is to ensure that impacts of the project will be adequately and appropriately considered and mitigation measures for adverse significant impacts incorporated when decisions are taken. The report covers all the findings, analyses, results and recommendations of the study and contains all supporting materials. It includes, among others, a review of environmental policy and the legislative framework, a description of the existing environmental condition, the anticipated impacts of the road upgrading project, the proposed mitigation measures, EMP for impact mitigation and a monitoring plan with their an estimated cost.

0.2 Objectives of ESIA and Study Methodology

The main objectives of the ESIA study are as follows:

- To update and revise the previous ESIA of the project,
- To fill the identified gaps and to make the report complete,
- To describe the current environmental and socio-economic baseline conditions of the road environment;
- Assess the potential positive and negative effects of the proposed road-upgrading project;

- Recommend appropriate mitigation measures to avoid or minimize any undesirable effects resulting from construction and operation of the road project.

The purpose of the study is to ensure that the environmental effects of proposed activities are adequately and appropriately considered before decisions are taken for their implementation.

Data required for the preparation of the revised ESIA was collected from different sources. These include:

- From other components of the project (hydrology, geotechnical and materials, and engineering studies)
- Previous ESIA study and related documents
- Relevant offices and authorities
- Field assessment along the project corridor
- Public consultations.

The collected data and documentation were evaluated and analyzed in order to:

- Describe and assess the effectiveness of relevant policies and legislative framework
- Describe the current baseline condition of the project area
- Identify, predict and evaluate the potential impacts of the project.

0.3 Policy and Legal Framework

The Constitution of Ethiopia adopted in August 1995 requires current and future legislation and the conduct of government to conform to a bill of rights. The concepts of sustainable development and environmental rights are entrenched in the rights of people in Ethiopia through articles 43 and 44, which state among other matters the right to development and right to live in a clean and healthy environment.

Some of the policies, proclamations and guidelines reviewed and incorporated into the ESIA include the following:

- Plan for Accelerated and Sustained Development to End Poverty (PASDEP)
- The Environmental Policy of Ethiopia (EPE) issued in April 1997
- Environmental Protection Organs Establishment Proclamation (Procl. No. 295/2002)
- Environmental Impact Assessment Proclamation (Procl. No. 299/2002)
- Environmental Pollution Control Proclamation (Procl. No. 300/2002)
- Oromia Rural Land Use and Administration Proclamation (Procl. No. 56/2002)
- Environmental Impact Assessment Guideline Document prepared by EPA
- ERA's Standard Environmental Methodologies and Procedures Manual (2001)
- Review of Environmental Institutions, etc.

- Policies and proclamation to be triggered by the implementation of the subject project. (proc 300/2002, Proc299/2002 and regulation 135/2007

0.4 Description of Baseline Condition

0.4.1 The Project Location and Description

The Konso - Yabelo road project starts at about 1.5 km away from the Konso town and heads towards southeast to reach Yabelo town located in the Oromia Regional State. However, in the meantime about 2.5km of the road at Yabelo town has been asphalted. This has reduced the total length of the project road by 2.5km as compared to the project's original plan. On the other hand, the starting point of the road being at 1.5 km away from the Konso town has created negative feeling among the authorities of the Konso special woreda. During the discussion with local authorities, they requested concerned bodies to reconsider the starting point of the project road and they suggest that the road should start at the center of Konso town. However, ERA makes it clear that the first 1.5 km of the road from Konso town to the project's starting junction has been included in the Fesehagenet - Konso road project and it is under parallel study. The clarification made by ERA is attached in Annex 8 of this report.

0.4.2 Physical Environment

The road project is located in the southern part of the Lakes Basin with general drainage pattern towards the south. The topography of the project area is predominantly flat and rolling with some hilly and mountainous terrain. The geological formation of the Konso - Yabelo area comprises mainly volcanic rocks, alluvial deposits, intrusive rocks, and stratified metamorphic rock.

The availability of perennial surface water in the project areas is very limited. The only perennial river intercepted by the Konso - Yabelo Road is Segen River. The climate of the Konso - Yabelo area varies between a tropical climate in the Konso area and semi-arid conditions towards Yabelo. The Konso area has a mean annual rainfall of 600mm to 1500mm, and the Yabelo area 400mm to 800mm.The mean annual temperature ranges from 20^{o}C to 25^{o}C, and 25^{o}C to 30^{o}C for Konso and Yabelo respectively.

The dominant soil type along the Konso - Yabelo Road is brown clayey silt. Soil erosion and siltation are major environmental problems in most parts of the project area.

0.4.3 Biological Environment

The road project area is relatively rich in both vegetation and wildlife resources. It is mostly characterized by dense Acacia-Commiphora Woodland and Bush land. The vegetation predominantly comprises small trees and shrubs that are adapted to tolerate droughts by having either small deciduous leaves or leathery persistent ones. Its floristic composition is predominantly Acacia species followed by Commiphora species. The undergrowth is usually a combination of suffrutescents and grasses.

The road project is mainly located within areas designated as Wildlife Reserve and Controlled Hunting Areas, which in practice have not received any development or management plan. Therefore, it appears that indiscriminate hunting together with habitat degradation has considerably reduced wildlife number. The main wild animals indicated to be present in the project area include Burchell's Zebra, Greater Kudu, Dik-dik, Bushbuck, Duiker (*Cephalophus sylvicapra)*, Oribi (*Ourebia ourebi)*, Klipspringer

(*Oreotragus oreotragus)*, Gerenuk (*Litocranius walleri),* Hyena, Baboon and Grivet Monkey.

0.4.4 Social and Economic Environment

The total population of the Woredas crossed by the project road is estimated to be about 431,023 in 2009. The rural population accounts for about 94% of the total. Average family size is estimated to be in the range of 5-6 persons per household. The population density, on average, is about 23 persons per square km.

The indigenous people belong to either the Konso or Oromo ethnic groups. Livestock keeping is the mainstream of the local pastoral economy of the Oromo. The Konso people are basically mixed farmers. Annual food crop production within the ZoI hardly amounts to 50% of annual food requirements for the rural population alone. The remainder comes from livestock products, market purchase and/or exchange of food grains for live animals.

Average cropland cultivated by an individual farm family per head is estimated to be 0.5 ha.

Social facilities and services are, in general terms, poorly developed and used.

0.5 Assessment of Potential Impacts

The construction and operation of the proposed road project is expected to bring both positive and negative impacts on the natural and social environment. The impacts will vary in intensity and duration. Some will have short-term effects, while others will have long-term implications. The main potential impacts are summarized below.

0.5.1 Positive Impacts

The expected benefits of upgrading and operation of the Konso - Yabelo road project include the following:

- With the provision of adequate and proper drainage structures, cross drainage will improve, as well as the drainage of the road surface and longitudinal drainage, thus minimizing erosion and siltation problems.
- The local economy will improve because of transportation opportunities and easy access to market outlets.
- It will offer the opportunity to exploit natural resource products such as frankincense and natural gum.
- The opportunity to provide a wider and better range of services, including potable water, health care, education, administration, security and extension services will increase.
- An improved road will facilitate the delivery of grain supplies in the event of drought and consequent famine.
- It will contribute to tourism development in the southern region, which is rich in wildlife and cultural diversity that has a high potential for attracting tourists.

0.5.2 Negative Impacts on Physical Environment

The main negative impacts on the physical environment will include the following:

- The road construction will exacerbate soil erosion through clearing, grubbing and excavation of soil to increase the road width, construct drainage structures, extract construction materials from quarries and borrow pits, and establish construction camps and material storage sites. All these activities will disturb the soil and expose it to runoff and wind erosion.
- The runoff concentrated in cross drainage structures, side ditches and diversion drains will be likely to cause significant erosion or scouring in the drainage structures and in areas downstream.
- Cuttings in a few small sections of the road, is likely to induce instability problems in adjacent slopes.
- Road construction will likely increase the rate of sediment loading, siltation and channel modification in rivers, streams and other waterways due to enhanced soil erosion, modification of the natural flow of surface water and drainage patterns, and increased speed of flows.
- Construction activities are likely to cause air pollution in the vicinity of the road, borrow pits and quarry sites, due to the generation of suspended particles from earthworks and vehicle movements on unpaved or dusty roads.
- Road construction activities, quarrying for construction materials and construction vehicles do generate noise nuisance to settlements within the ZoI.

0.5.3 Negative Impacts on Biological Environment

The proposed road project will basically follow the existing alignment. Additional damage to the natural vegetation will result from increasing of the road width, realignments and extraction of construction materials from quarries and borrow sites. These activities will mainly affect narrow strips of bushy and woody vegetation found along the alignments and the same type of vegetation from quarry and borrow sites. In addition, in the section located in the Yabelo State Forest, some Juniperus trees are expected to be felled for widening of the road. However, the extent of vegetation damage and loss of flora can be considered as a moderate impact if precautions are taken during construction and a restoration programme is implemented.

Impacts on fauna and wildlife habitats will include:

- Reduction of available wildlife habitats due to land acquisition for expansion of the road width and use of construction materials.
- Disturbance of wild animals in the road corridors, disruption of habitat use or migration patterns, and increased rate of accidental killing of animals while crossing the road, due to increase in traffic and heavy construction equipment.
- Bridge construction on rivers is expected to cause significant impacts on water quality and the aquatic ecology, especially fish.

0.5.4 Impacts on Socio-Economic Environment

The construction and improvement of rural roads results, among others, in a facilitated and improved transport system.

The role of transport in rural development is, among others, a vital factor in rural productivity as well as an essential social amenity. The latter provides mobility and social amenity.

The project areas lack facilities for mobility and communication. The communities have consequently been isolated from the exchange of innovative ideas, and have therefore lagged behind in terms of socio-economic development opportunities.

It is perceived among the target communities that traditional ways of life have persisted due to their long-enduring isolation, and also due to distrust of and reluctance to adopt new and innovative ideas. Hence the project road is expected to produce significant positive impacts.

However, the following negative impacts will also arise in the socio-economic environment:

- Loss of farm and grazing land
- Social disruption
- Community dissatisfaction
- Conflict of interests
- Resource-use conflicts
- Widening of the road will affect some houses situated in the Road right of way, particularly at Elwoya town.

0.6 Analysis of Alternatives

Improving the proposed road is seen as the most feasible and useful means for alleviating the socio-economic problems of the region of influence, and for the development of the national economy than other alternatives. Following as much as possible the existing alignment also appears to be the most sound route option in terms of technical and economic feasibility, socio-economic benefits and environmental effects.

0.7 Impact Mitigation Measures and Monitoring Plan

The upgrading of the proposed road will not cause environmental effects of a degree that cannot be solved with normal good engineering practice together with integrating the necessary environmental and social mitigation measures in the planning and execution of the project. In locating the alignment, besides the technical issues, environmental considerations have been given due attention in order to minimize adverse environmental effects. Mitigation measures that can help to avoid or reduce the potential negative impacts are proposed, as well as a management plan for their implementation. The revised ESIA study has also proposed a monitoring plan to allow a close follow-up of the effectiveness of the implemented measures, timely detection of any unpredicted impacts, and effective implementation of corrective measures.

0.8 Environmental Mitigation, Management and Monitoring Cost Estimate

The environmental mitigation, management and monitoring cost estimated to be about **13.6 million** Birr when 30m ROW is considered and **26.5 million** Birr when 50m ROW is considered. The estimated high cost of socio-environmental mitigation and management is

due to high cost of compensation for affected houses located in the ROW. In general, the cost estimates is based on the following assumptions:

- Items of an engineering nature that are in any case required under the construction contract and do not involve additional costs have been excluded from this cost estimate. Examples are drainage structures, retaining walls and lined drains that are designed to control or prevent soil erosion and slope instability.
- The costs of mitigation measures to be implemented by the Contractor during construction are considered as included in his obligations under the construction contract. This applies to such measures as good management of the construction equipment and vehicles, workforce/camp management, good construction works, provision of necessary facilities for the workforce and proper waste management or disposal, restoration of campsites, borrow pits and quarries, traffic safety, etc.
- Some of the mitigation measures to be implemented by the local government organizations are considered as part of their routine jobs. For example, law enforcement, controlling illegal establishment of settlements and exploitation of natural resources, educating people about health and traffic safety, etc.

0.9 Conclusions and Recommendations

0.9.1 Conclusion

Based on over all analysis and synthesis of the study findings it is concluded that the upgrading and operation of the Konso - Yabelo road will bring a variety of benefits at both local and national level. In particular, the impact at local level is increasing the reliability of road transport and the potential to develop the local economy through improved infrastructure and employment opportunities will be significant. The road will also create alternative route to Addis - Moyale road and promote easy transportation of import and export goods between Ethiopia and Kenya and attract tourists to Konso, Omo valley and Chew Bahir areas which are rich in wildlife and different cultures.

On the other hand, the proposed project activities will bring some negative impacts to the natural and social environment. Many of these impacts will be short-term and reversible in nature, but some will be permanent impacts. The potential significant impacts will include soil erosion, slope destabilization, siltation, ecological disturbances (deforestation and disruption of wildlife), spreading of communicable diseases, and disturbance to tribal people.

The widening of the road will also affect some houses situated in the Right of way, particularly at Elwoya town. However, these impacts can be reduced to acceptable levels with normal good engineering practice coupled with integrating the environmental and social mitigation measures into the planning and implementation schedule of the road development. Particularly reducing ROW to 30 m at Elwoya town would reduce the impact of the road on settlement and minimize the cost of compensation. It can therefore be concluded that there are no severe or impacts that cannot be mitigated to prevent the implementation of the road upgrading project.

0.9.2 Recommendation

To maximize the efficiency of the road construction project and reduce the magnitude of the unwanted effects to acceptable levels, it is essential that the proposed mitigation measures be applied at the correct time through the environmental management plan, and

by incorporating the relevant ones into the engineering design so that they are implemented. A close follow-up of the effectiveness of the implemented measures through a well-planned monitoring program is also critically important.

Considering 50m ROW would result in a high cost of compensation as it affects several houses at Elawoya town. Therefore, it is recommendable to minimize ROW to 30m or less, particularly at Elwoya town.

The number of project affected people (PAPs) who are expected to lose their houses in Konso and Teltele woredas are below 200, while number of PAPs in Yabelo Woreda is currently estimated to be more than 200. However by incorporating the appropriate mitigation measures in the design of the road, the impact would be reduced to the minimum. Some of the proposed mitigation measures to reduce adverse impact of the road construction on settlement areas, particularly at Elwoya town of Yabelo Woreda are reducing the right of way to 30m or less and shifting the centerline of the road towards left side where few houses would be demolished as compared to right side. But to take the appropriate mitigation, Preparation of the RAP is of paramount importance if there are PAPs, will be decided once the land acquisition study is completed.

1 INTRODUCTION

1.1 General

The Government of Ethiopia in Plan for Accelerated and Sustained Development to End Poverty (PASDEP) recognizes that environmental resources are the foundation of social and economic development as they are the sources of goods and services needed for poverty reduction and economic growth. However, environmental degradation and mismanagement of natural resources reduces the environment's ability to produce biomass for food, feed and household energy. It undermines prospects for fighting poverty and achieving sustainable development. Rapid and severe degradation can also lead to special circumstances in the society, such as migration, deterioration of the person's health condition, displacement of indigenous peoples or communities and lack of access to basic environmental services such as clean water, bio-fuel, etc. These changes put added stress on the lives of the people. Therefore, any development program and projects should work alongside a framework of growth that seeks to maximize quality of life and minimize environmental costs.

One of the major activities contributing for environmental degradation in Ethiopia is road construction. The key environmental problems associated to road construction are removal of vegetation cover from road right-of-way, borrow areas, quarry sites, camp sites and accelerating soil erosion and soil compaction. Water and soil pollution, especially by construction spoils and other related waste from construction camps and workshops are becoming serious challenges.

Therefore, the need to incorporate environmental and social impact considerations during the planning and implementation phases of road projects has become a pressing issue to minimize the adverse effects on the environment. Environmental and social Impact Assessment (ESIA) is a set of activities undertaken to ensure that a road development project enhances both the environmental context in which it is implemented, and the well-being of the communities that it is meant to serve.

Accordingly, ERA has entered an agreement with Renardet S.A consulting firm to revise the Konso - Yabelo road upgrading project feasibility study, environmental impact assessment and detailed design report which was conducted in 2004 by GIBB (East Africa LTD). Hence, this report presents the revised ESIA report whose purpose is to ensure that impacts of the project will be adequately and appropriately considered and mitigation measures for adverse significant impacts incorporated when decisions are taken. The report summarizes all the findings, analyses, results and recommendations of the study and contains all supporting materials. It includes, among others, a review of environmental policy and the legislative framework, a description of the existing environmental condition, the anticipated impacts of the road upgrading project, the proposed mitigation measures, EMP for impact mitigation and a monitoring plan with their an estimated cost.

1.2 Project Background and Justification

1.2.1 Project location

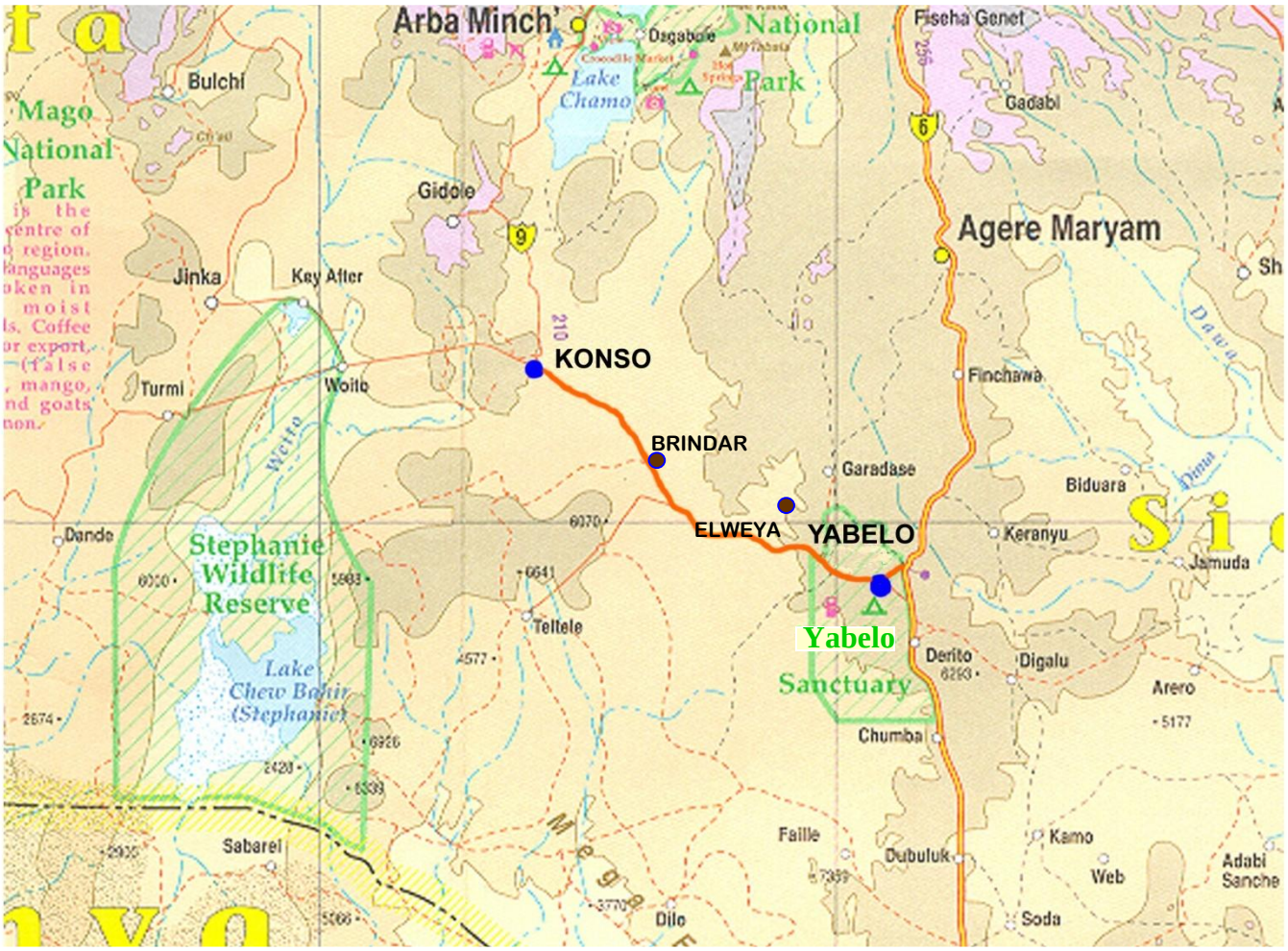
The Konso - Yabelo road project starts at about 1.5 km away from the Konso town and heads towards southeast to reach Yabelo town located in the Oromia Regional State. However, in the meantime about 2.5km of the road at Yabelo town has been asphalted. This has reduced the total length of the project road by 2.5km as compared to original plan. On the other hand, the starting point of the road being at 1.5 km away from the

Konso town has created negative feeling among the authorities of the Konso special woreda. During discussion with local authorities, they requested concerned bodies to reconsider the starting point of the project road and they suggest that the road should start at the center of Konso town. However, ERA makes it clear that the first 1.5km of the road from Konso town to project's beginning junction has been included in the Fesehagenet - Konso road project and it is under parallel study. The clarification made by ERA is attached in Annex 8 of this report.

Redefining of the project road length in accordance to the above discussion would reduce the total length of the project road from 105 km to 102.5km. Of which the first 35.5 km (Konso - Brindar) is dry weather road with no drainage structures; while the remaining 62.0 km (Brindar - Yabelo) is a gravel road. The rest 5km from Yabelo Town to Moyale road junction is an existing asphalt surfaced road.

Administratively, the first 21km of the Road lies in Konso Special Woreda of the SNNPR and the remaining part in Teltele and Yabelo Woredas of Borena Zone in Oromia Region.

LOCATION MAP



Legend:
- Project Road
- Towns
- Villages
- Yabelo Sanctuary

1.2.2 Project Justification

The Konso - Yabelo project road links two regional states and three woredas and its upgrading to all weather road is expected to stimulate economic growth and social services development in the impact zones. The main impact zones of the road project will be the three woredas. By connecting or leading nearby areas of high wildlife resource and different cultures, the road will play an essential role for the development of the tourism industry in the region. The road will also create alternative route to Addis - Moyale road and promote easy transportation of import and export goods between Ethiopia and Kenya.

The road project is also aimed at improving the road network of the country in both quantitatively and qualitatively. Besides increasing the road network and creating road access to the local people residing in the project area, the construction of the road will provide better access to other economic development program of the government and increase socio-economic growth in the project influence areas.

Construction of the road will also attract private investors to the area and increase public private participation in the development effort to boost the country's economy.

However, road construction does not always have high socio-economic benefits without causing adverse effects to the environment. Serious disruption of the bio-physical resources, social structures and infrastructures can be resulted in a road project designed and constructed without considering socio-environmental issues.

Therefore, integrating socio-environmental concerns into the proposed road design and construction activities appeared to be essential to minimize adverse impacts and to enhance benefits from the project.

This revised ESIA report therefore discusses environmental and social issues of the project road and comprises environmental mitigation and management plans to be implemented so that the project would be environmentally feasible, socially acceptable and economically justifiable.

1.3 Objectives

The main objectives of the ESIA Study are as follows:

- To describe the environmental and socio-economic baseline conditions of the road Environment,
- Assess the potential positive and negative effects of the proposed road upgrading project
- Recommend appropriate solutions to avoid or minimize any undesirable effects resulting from construction and operation of the road project
- Prepare environmental management and monitoring program

The purpose of the study is to ensure that the environmental effects of proposed activities are adequately and appropriately considered before decisions are taken for their implementation.

Further the ESIA is undertaken to ensure that:

- The most feasible road alignment will be selected,
- Negative environmental and social impacts will be mitigated and positive impacts strengthened,

- Impacts will be monitored,
- Collaboration between partners at different levels will take place and/or will be institutionalized.

The principle is that the environmental and social issues are considered together with the technical and economic aspects when selecting the most feasible alternative.

1.4 Methodology of Assessment

1.4.1 Sources of data collection

Data required for the environmental and social impact assessment of the road upgrading project was collected from different sources using different data collection methods. The main sources of data include:

- **Other project components:** These included hydrology, soils and materials (geotechnical) Investigations and engineering studies. Of the data collected or generated by those teams, the ones relevant for environmental assessment were extracted and utilized for the baseline description and impact analysis. Important maps such as the 1:250,000 and 1:50,000 scale topographic maps produced by Ethiopian Mapping Authority (EMA) were also used.
- **Previous studies and documents:** Relevant documents on previous studies, policies, guidelines and legislation including those given in the list of references were collected from federal and regional organizations, personal holdings, etc.
- **Relevant offices and authorities:** These included regional, zonal and woreda level government organizations and NGOs involved in public administration and development activities in the project areas. Relevant data has been obtained from documents or archives and from discussions with officials and professionals. A list of these persons consulted during the study and minutes of meetings are presented in **Annex 1a, 1b** and **Annex 2** respectively.
- **Field assessment:** Field investigations were conducted throughout the entire project roads, and detailed data on the natural environment and socio-economic settings was collected using checklists and data collection sheets (See **Annex3**).
- **Public consultations**: Formal group meetings as well as informal discussions with the local people and leaders were held in different localities along the road alignment. Relevant information was obtained, including constraints related to the existing conditions of the road, benefits and disadvantages of upgrading the road, and their overall opinion on the proposed project.

1.4.2 Data Analysis

The data and documentation collected was reviewed and analyzed for three main purposes:

- To describe and assess the effectiveness of relevant policies and legislative framework within which the environmental assessment is undertaken.
- To describe the existing condition of the physical, natural, social and economic environment of the region in which the road project is situated; in the description of the baseline condition, particular emphasis was given to the road environment that will be impacted by road construction activities.

- To identify, analyze and evaluate the potential impacts of the road upgrading project, and to recommend mitigation measures for significant negative impacts.

1.4.3 Impact Analysis and Evaluation

(a) Initial Environmental Examination (IEE):

Initially the road project was screened using the EPA EIA Guideline Document and ADB Initial environmental Examination Checklist. The purpose of conducting the IEE was to determine whether the road project would require a full EIA or not. The results of the IEE showed that the proposed project would require a full EIA. The details of the IEE process are given in **Annex 4**.

(b) Impact Identification, Characterization and Evaluation:

Environmental impact analysis was carried out in three stages:

Identification – This includes description of the existing environmental system, determination of the components of the project, and definition of the environment modified by the project.

Prediction – Identification of significant environmental modifications, forecasting of the quantity and/or spatial dimensions of the change, and estimation of the probability that the impact will occur.

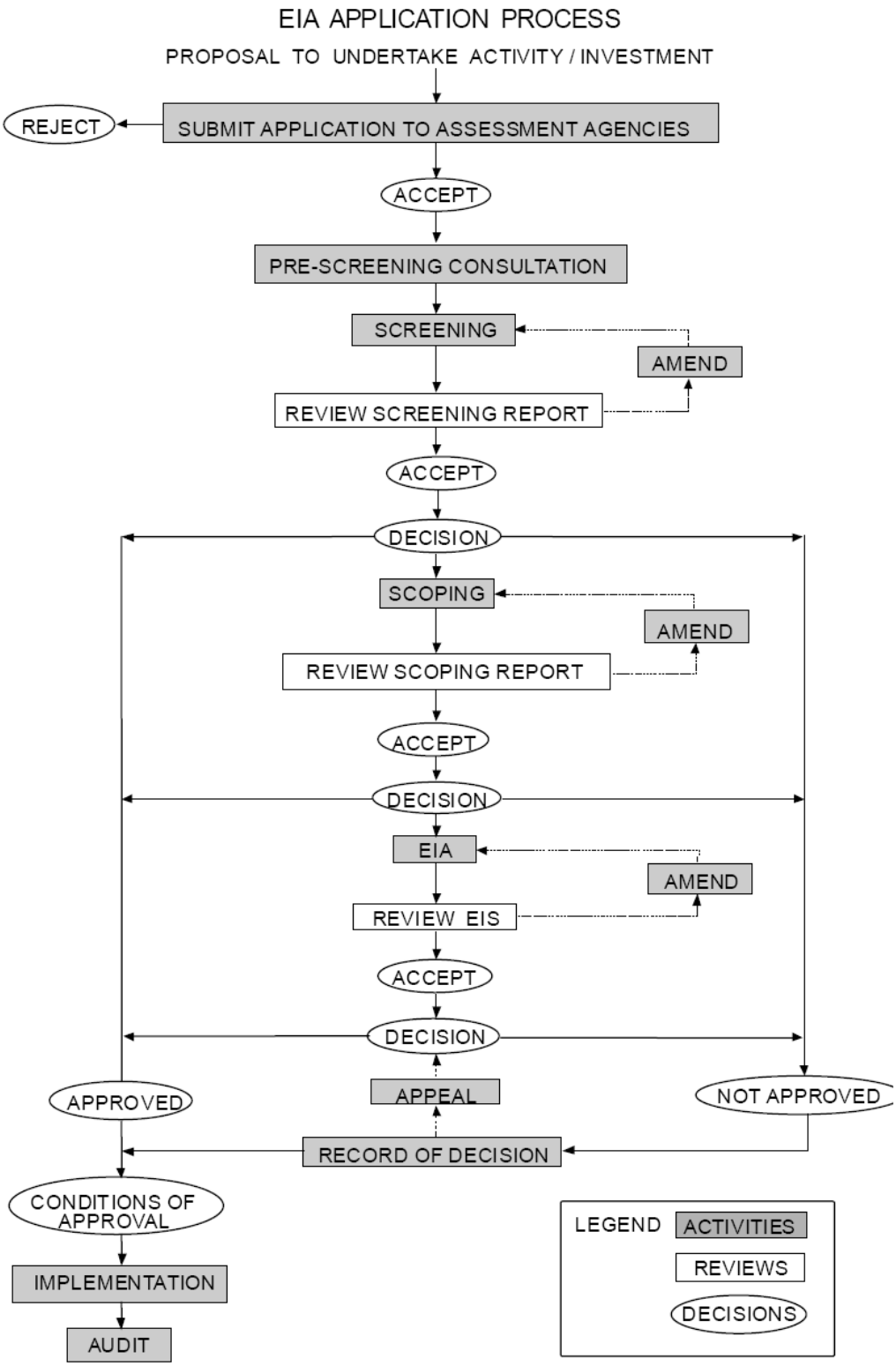
Evaluation – Determination of the incidence or magnitude and significance level of the impact without mitigation**.**

The predicted environmental impacts are characterized or defined as:

Nature of Impact:	Direct, Indirect or Cumulative
Type of Impact:	Positive, Negative or Both
Duration of Impact:	Short-term, Medium-term or Long-term
Area, Extent or Spatial Scale of Impact:	Localized or Widespread
Severity of Impact:	Low, Medium or High.

Finally, the magnitude and significance level of the identified impacts was evaluated as non significant, low, medium or high. The project activities or components affecting the environment, and the predicted impacts and their characterization and evaluation, were summarized in a matrix. The criteria for rating the impacts are given in **Annex 5.**

FIGURE 1: The EIA Application Process



2 STRATEGIES, POLICIES, LEGISLATIONS, INSTITUTIONAL AND ADMINISTRATIVE FRAME WORKS

2.1 The Constitution of the FDRE

The Constitution of the FDRE is the supreme law of Ethiopia where all national policies, laws and regulations as well as the institutional frameworks of the country are emerged. The Constitution of the Federal Democratic Republic of Ethiopia, Proclamation 1/1995, has several provisions to mitigate the adverse impacts on people who might be affected during the implementation of government projects such as the Road Sector Development Program prepared by the Ethiopian Roads Authority.

Art. 40.3 of the Constitution states that both rural and urban land as well as all natural resources are under public ownership. There is no private ownership of land in Ethiopia. As per FDRE Constitution, either rural or urban land could not be sold or mortgaged or transferred. However, the Constitution gives right to both rural and urban people to use the land and to be benefited from its development. Any interference on the right to use the land such as expropriation shall entail compensation. This is certainly provided in Art. 40.7 of the Constitution which says that "Every Ethiopian shall have the full right to the immovable property he builds and to the permanent improvements he brings about on the land by his labor or capital." Moreover, Art. 40.8 reinforce this provision by providing for expropriation of private property by the government for public purposes subject to the payment in advance of compensation commensurate with the value of the expropriated property.

The other important among the provisions of the Constitution is Art 44.2. It states "All persons who have been displaced or whose livelihoods have been adversely affected as a result of state programs, have the right to commensurate monetary or alternative means of compensation, including relocation with adequate state assistance".

Thus, persons who have lost their land as a result of acquisition of such land for the purpose of road works are entitled to be compensated to a similar land plus the related costs arising from relocation; assets such as buildings, crops or fruit trees that are part of the land etc. The Resettlement/Rehabilitation Policy Framework prepared by ERA also expressly and appropriately recognizes that Art. 44.2 of the Constitution of the Federal Democratic Republic of Ethiopia provides the basis for the compensation procedures and the legal framework for its resettlement and rehabilitation policy (ERA, 2002, p.13)

2.2 Development Strategies

2.2.1 Agricultural Development Led Industrialization Strategy (ADLI)

ADLI is seen as a long-term strategy to achieve faster growth and economic development by making use of technologies that are labor intensive, but land augmenting, such as use of fertilizer and improved seeds and other technologies. However, the extremely small ratio of urbanization of the country threatens to make inadequacy of domestic demand, a critical constraint. This implies that agriculture has to be made internationally competitive, and that, part of its production has to be oriented towards exports.

2.2.2 Industrial Development Strategy

Giving a lead attention to manufacturing sub sector, the strategy recognizes the importance of other related areas including construction. It has acknowledged the private sector as an engine of development in realizing the growth of the industrial sector. Moreover, the strategy has

taken on board the importance of integrating the national effort with the global agenda in attaining competitiveness in the sphere of product quality pricing and timing. The strategy gives due considerations to conducive and stable macroeconomic environment to encourage private sector. Furthermore, establishment of rural finance institution, provision of land, drinking water, as well as other infrastructures are seen as important elements of the strategy.

2.2.3 Conservation Strategy of Ethiopia (CSE)

Since the early 1990s the Government has undertaken a number of initiatives to develop regional, national and sector strategies for environmental conservation and protection. Paramount amongst these was the Conservation Strategy of Ethiopia (CSE, 1996) approved by the Council of Ministers, which provides a strategic framework for integrating environmental planning into new and existing policies, programs and projects. The CSE is an important policy document, which views environmental management from several perspectives. In particular, it recognizes the importance of incorporating environmental factors into development activities from the outset, so that planners may take into account environmental protection as an essential component of economic, social and cultural development.

2.2.4 The Plan for Accelerated and Sustained Development to End Poverty

The Plan for Accelerated and Sustained Development to End Poverty (PASDEP) is the Ethiopia's guiding strategic framework for the five-year period 2005/06-2009/10. The main development objective of the Ethiopian Government is poverty eradication. Hence, the country's development policies and strategies are geared towards this end.

The PASDEP represents the second phase of the Poverty Reduction Strategy Program (PRSP) process, which has begun under the Sustainable Development and Poverty Reduction Program (SDPRP), which covered 2002/03-2004/05. The PASDEP carries forward important strategic directions pursued under the Sustainable Development and Poverty Reduction Program (SDPRP) -related to infrastructure human development, rural development, food security, and capacity-building- but also embodies some bold new directions. Foremost among them is a major focus on growth in the program period with a particular emphasis on greater commercialization of agriculture and enhancing private sector development, industry, urban development and a scaling-up of efforts to achieve the Millennium Development Goals (MDGs).

The objectives of the PASDEP are:

- To define the nation's overall strategy for development for the coming five years;
- to lay out the directions Ethiopia wants to take, with the ultimate objective of eradicating poverty; and
- To outline the major programs and policies in each of the major sectors.

Concerning the road development sector, during the SDPRP period, priority had been given to new road construction and major rehabilitation/upgrading/maintenance work. Accordingly, out of the targeted 5,637 km road development, 5,561 km were completed; of which 1,276 km were new rural roads. Road density had increased from 32.3 km/1,000 km^2 in 2001/02 to 33.6 km/ 1000 km^2 by the end of the program period (2004/05). The main challenges during the program period were raising adequate financing for the major investments required, ensuring continued maintenance, and the limited domestic construction capacity.

Road Sector Development Program under PASDEP (2005/06-2009/10) is a continuation of SDPRP and it comprehends that the investment and policy reforms in the road sector need to be continued since a partial implementation would fail to yield the full potential benefits agreed among different stakeholders. Rehabilitation of the existing limited paved trunk road network and provision of funds for minimum maintenance alone will not ensure sustained protection of the network as a whole. Without continuing investments in follow-on projects included under RSDP/SDPRP, vehicle-operating costs will remain high, and evacuation of agricultural production will continue to suffer from inaccessibility resulting in high transportation costs. Therefore, under PASDEP the primary objectives of the Road Program are:

- To sustain road sector reforms and to restore and expand Ethiopia's road network and provide a sustainable level of essential road infrastructure to the rural population;
- Side-by-side, the program assists in developing a strong management and technical capacity to manage the road network; and,
- The development of the capacity of the domestic construction industry.

The physical targets set are to:

- Reduce the inhabited land area farther than 5 km from a road to 59% by the end of 2009/10, from the current 72% (2004/05);
- Reduce the inhabited land area farther than 2 km from a road to 81% by the end of 2009/10, from the current 88% (2004/05);
- Reduce average walking distance from a road to 3.2 hours by the end of 2009/10, from the current 5 hours (2004/05);
- Increase the road density to 54.1 km/1,000 km^2 or 0.72 km/1,000 people by the end of 2009/10 (including low class roads) - from the current 33.6-km/1,000km^2 or 0.51 km/1,000 people (2004/05); and,
- Increase the rate of acceptable (good + fair) roads to 84% for all road types by the end of 2009/10, from the current level of 64%10 (2004/05).

Specifically, the Program would consist of:

- Civil works program including rehabilitation/upgrading of 4,890 km of federal roads, new construction of 2,715 km of federal roads, and improvement of bridges and structures;
- Road maintenance program including periodic maintenance on 3,515 km of federal roads, and routine maintenance on all types of roads;
- Regional road construction/maintenance program including construction of 8,226 km of regional roads, periodic maintenance on 637 km of regional roads, and construction of 85,900 km of low class (ERTTP) roads;
- Institutional support to strengthen ERA, Rural Road Authorities (RRAs), Road Fund Administration (RFA), Domestic Construction Industries (DCI), man-power training and conduct of different studies to support the vast increase in activities under the program, and overcome the general lack of experience in the sector; and,
- A number of policy and institutional support studies such as Geographical Information System (GIS) for the Ethiopian road network, Transport Poverty

Observatories, rural transport issues, road financing, national transport master plan, performance monitoring and a variety of system studies.

Concerning environment PASDEP recognizes that environmental resources are the foundation of social and economic development as they are the sources of goods and services needed for poverty reduction and economic growth. Their mismanagement coupled with their underutilization has so far reduced their contribution to Ethiopia's overall development.

Land is the critical resource and the basis of survival of all Ethiopians. Land degradation is thus a serious problem. Overgrazing and the expansion of farming into unsuitable land caused by increasing population without increasing economic productivity are leaving the land bare. Present key component problems in land degradation include loss of vegetation cover and biodiversity followed by escalating soil erosion, declining soil fertility, expanding salinization and soil compaction as well as desiccation through hydrological cycle disruption. Water and soil pollution, especially by agrochemicals, are becoming serious challenges in some areas.

About 70 per cent of the total area of the country is dry sub-humid, semi-arid or arid and thus vulnerable to desertification. Because it is mountainous, even the humid part of the country is prone to land degradation. Recurrent droughts and extreme weather events associated with climate change are compounding the land degradation problem.

Environmental degradation threatens physical and economic survival. It reduces the environment's ability to produce biomass for food, feed and household energy. It undermines prospects for fighting poverty and achieving sustainable development. Reversing environmental degradation and poverty eradication are, therefore, mutually reinforcing imperatives and have to be implemented together in Ethiopia's development initiatives. National economic development programs and national environmental regulatory systems must, therefore, be harmonized to optimize these initiatives. This means that it is urgent for Ethiopia to take the necessary action, as envisaged in the MDG to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and enhance the quality of life of its present generation of citizens without compromising that of its future generations.

In general environmentally Sound Development Vision of Ethiopia is to create a self-reliant Ethiopian population with a high quality of life in a productive environment, which assures equity between genders and among generations. This Environmentally Sound Development Vision of Ethiopia can be achieved by ensuring social, economic and environmental sustainability in development. Overall, this is guided by the Environmental Policy of Ethiopia issues in 1997.

The major strategic Goals towards the Realization of the Environmentally Sound Development Vision of Ethiopia are:

- Ensure community-led environmental protection and the sustainable use of environmental resources for gender equity and improved livelihood;
- Rehabilitate affected ecosystems;
- Enhance capacity of ecosystems to deliver goods and services, particularly biomass for food, feed and household energy;
- Remove the adverse impacts of municipal waste;
- Prevent environmental pollution; and,

- Ensure proactively the integration of environmental and ethical dictates especially mainstreaming gender equity in development.

Implementation Strategies envisaged in the PASDEP to achieve the above stated environmental conservation and management goals are:

- Promotion of a participatory and problem solving livelihood improvement framework for gender equity, environmental protection and the sustainable use of environmental resources;
- Partnership building with all stakeholders for environmental management;
- Development of tools for proactive environmental management that has mainstreamed gender equity;
- Improvement of a gender balanced environmental knowledge through awareness raising programs;
- Building environmental information and networking system;
- Promotion of investment in environmental protection and the sustainable use of environmental resources for the improvement of livelihoods; and,
- Resource mobilization and channeling for the required activities.

2.3 Policies

2.3.1 Environmental Policy

The Environmental Policy of Ethiopia (EPE) was issued in April 1997. The EPE supports Constitutional Rights through its guiding principles. The overall policy goal is to improve and enhance the health and quality of life of all Ethiopians, and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole, so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

The policy seeks to ensure the empowerment and participation of the people and their organizations at all levels in environmental management activities, and to raise public awareness and promote understanding of the essential linkage between the environment and development. In addition, the EPE has outlined its guiding principles. Sector and cross-sector environmental policies will be checked against these principles to ensure consistency.

Environmental Impact Assessment (EIA) policies are included in the cross-sector environmental policies. The EIA policies emphasize the early recognition of environmental issues in project planning, public participation, mitigation and environmental management and capacity building at all levels of administration.

The policy establishes the Environmental Protection Authority (EPA) as the body to harmonize Sector Development Plans and to implement an environmental management program for the country. It also imparts political and popular support to the sustainable use of natural, human-made and cultural resources at the federal, regional, zonal, woreda and community levels.

2.3.2 Land Policy and Tenure

The Constitution of Ethiopia states that the right to ownership of rural and urban land, as well as all natural resources, is exclusively vested in the state and in the people of Ethiopia. Article

40 of the Constitution indicates that land is a common property of the nation, nationalities and the people of Ethiopia, and shall not be subjected to sale or to other means of transfer. Based on this guiding principle, some regional states have issued policies on rural land use and administration. Among these policy documents, the ones relevant to the project under consideration are those of the *Oromia and SNNPR Rural Land Use and la*nd Administration**.**

The policy guiding principles include:

- Land ownership is exclusively vested in the State and people of the region and shall not be subjected to sale or to other means of exchange,
- Where the holding right changes under any change of holding, payment of due compensation is to be made by the new holder to a previous and lawful holder for improvements he/she had made on the land by his/her labor or capital, and
- Any land user is obliged not to mismanage or miss utilize the land provided to him/her with the land resources thereon.

2.3.3 National Policy on Women

The Federal Democratic Government of Ethiopia has declared its unequivocal commitment to the development of women with the announcement of the National Policy on Women in 1993. The Women's Policy primarily aims to institutionalize the political, economical, and social rights of women by creating an appropriate structure in government offices and institutions so that the public policies and interventions are gender-sensitive and can ensure equitable development for all Ethiopian men and women.

Consistent with the above policy, Article 25 of the new Constitution guarantees all persons equality before the law, and prohibits any discrimination on grounds of gender. In addition, Article 35 reiterates principles of equality of access to economic opportunities, including the right to equality in employment and land ownership. The democratization process the new constitution the women's policy and the institutional set up have created conductive atmosphere for the promotion and the advancement of women and the implementation of the plan of action.

The Policy states that the responsibility of ensuring the implementation of the National Policy on Women lies mainly with the Government. Besides, various women's organizations are formed to promote women issues in different areas.

All development program at National and Regional levels should be able to integrate gender concerns in their plans and program to see that women participate, contribute benefit and their effort is recognized and technologically supported. Thus the mainstreaming of gender in all development programs should focus at establishing a system where by each sector program would use gender as a measuring indicator to quantify project and achievements.

2.3.4 National Policy on HIV/AIDS

In view of the magnitude of the problem as well as the huge resources needed to combat HIV/AIDS, the Ethiopian Government issued a policy, which calls for an integrated effort of multi-sector response to control the epidemic of HIV/AIDS in 1998. The Ethiopian Government’s HIV/AIDS policy urges communities at large, including government ministries, local governments and the civil society to assume responsibility for carrying out HIV/AIDS awareness and prevention campaigns. The main objective of the policy is to provide an enabling environment for the prevention and control of HIV/AIDS in the country. The policy introduces and outlines the large social, psychological, demographic and economic

impacts that HIV/AIDS is causing and introduces a number of issues relating to HIV/AIDS. These are:

- HIV/AIDS is not only a health problem but also a developmental problem,
- gender inequality contributes to the further spread of HIV/AIDS,
- women, including women living with HIV/AIDS, need access to information and services regarding HIV/AIDS and to family planning provision to help them make reproductive choices and decisions,
- the magnitude of the problem will need considerable resources and a multi-sector effort to control the HIV/AIDS epidemic,
- there is a need for a holistic approach in the provision of care to people living with HIV/AIDS,
- the human rights of people living with HIV/AIDS needs to be recognized, and
- HIV/AIDS has the potential for catastrophic impact.

2.3.5 Sector Policy for HIV/AIDS Prevention and Control in the Work Places of ERA

ERA has prepared a sector policy for HIV/AIDS in the workplaces of ERA (June, 2004). In the policy ERA acknowledges the fact that the HIV/AIDS pandemic is a reality in the work place and may have detrimental effects on the goals and objectives of the authority. Therefore, the authority:

- Commits itself to create a supportive and non discriminatory working environment through dispelling of myths and stereotypes and by ensuring that infected employees are treated in the same manner as other employees,
- Seeks to minimize the social, economic and developmental consequences to the authority and its staff,
- Undertakes that management will provide resources and leadership to implement program for the prevention and control of the HIV/AIDS and sexually transmitted infections (STI),
- Commits itself to offering support, counseling and education services to infected & affected employees;
- Commits itself to establish and maintain an employee assistance program, and
- Insures sustainable resources for the prevention and control of HIV/AIDS.

The ERA task force is responsible and accountable for all programs for prevention and control of HIV/AIDS in the authority. The ERA's environmental monitoring and safety branch through the HIV/AIDS program coordinators is responsible for coordinating, implementing, monitoring and evaluating the policy provisions.

2.3.6 Biodiversity Policy

The biodiversity policy, which was approved in 1998, provides guidance towards the effective conservation, rational development and sustainable utilization of the country's biodiversity. In general, the policy consists of comprehensive policy provisions on the conservation and sustainable utilization of biodiversity.

2.3.7 Wildlife Policy

The Ministry of agriculture and rural Development has developed the Wildlife policy in 2006. The specific objectives of the policy include properly developing and administering the country's wildlife resources and enabling the sector to contribute fully to the economic development and the wellbeing of the ecosystem. The policy also includes articles on how to protect the wildlife resources and their habitat so that stability of the ecosystem is maintained for posterity, in accordance with international wildlife conventions and agreements to which the country is a signatory.

The most important articles, covered in the policy and strategy are to gazette the national parks, development of participatory wildlife management, to give special attention to the protection and conservation of the endemic and threatened wildlife, to promote wildlife health, to give due attention for the control of the illegal movement of wildlife and products among others are the most important points that has been dealt with in the policy and strategy.

2.3.8 Health Policy of Ethiopia

The health policy of Ethiopia was issued in Sept. 1993. It was prepared through critical examination of the nature, magnitude, and root causes of the prevailing health problem of the country and awareness of newly emerging health problems. It accords appropriate emphasis to the needs of the less privileged rural population, which constitute the overwhelming majority of the nation.

In general, the policy states that health development shall be seen not only in humanitarian terms but also as an essential component of the package of social and economic development as well as being an instrument of social justice and equity.

The overall health policy among others incorporates the following basic components:

- Democratization and decentralization of the health service system,
- Development of the preventive and promotive components of the health care,
- Development of an equitable and acceptable standard of health service system that will reach all segments of the population within the limit of resources,
- Promoting and strengthen of inter sector activities,
- Promotion of attitudes and practices conducive to the strengthening of national self-reliance in health development by mobilizing and maximally utilizing internal and external resources,
- Assurance of accessibility of health care for all segments of the population,
- Working closely with neighboring countries, regional and international organizations to share information and strengthen collaboration in all activities contributory to health development including the control of factors detrimental to health,
- Development of appropriate capacity building based on assessed needs,
- Provision of health care for the population on a scheme of payment according to ability with special assistance mechanisms for those who cannot afford to pay and

- Promotion of the participation of the private sector and nongovernmental organizations in health care.

The policy gives priority to:

- Information, education and communications of health to enhance awareness and to propagate the important concepts and practices of self responsibility in health,
- The control of communicable diseases, epidemics and diseases related to malnutrition and poor living conditions,
- The promotion of occupational health and safety,
- The development of environmental health,
- The rehabilitation of the health infrastructure,
- The development of an appropriate health service management system,
- Appropriate support shall be given to the curative and rehabilitative components of health including mental health,
- Due attention shall be given to the development of the beneficial aspects of traditional medicine including related research and its gradual integration into modern medicine,
- Applied health research addressing the major health problems shall be emphasized,
- Provision of essential medicines, medical supplies and equipment shall be strengthened, and
- Development of human resources with emphasis given on expansion of the number of frontline and middle level health professionals with community based, task oriented training shall be undertaken.

2.4 Environmental Impact Assessment Guidelines

2.4.1 EPA Environmental Impact Assessment Guideline

The EPA has issued a *Guideline Document* for EIAs. The document provides a background to environmental impact assessment and environmental management in Ethiopia. The document aims at being a reference source to ensure effective environmental assessment and management practice in Ethiopia for all parties who engage in the process. The long-term objectives of the EIA system as set out by the EPA are:

- Conservation and sustainable use of natural resources
- Integration of environmental considerations in development planning processes Protection and enhancement of the quality of all life forms
- Attainment of environmentally and socially sound and sustainable development.

The document details the required procedures for conducting an EIA in Ethiopia, and the requirements for environmental management. These requirements are presented on a step by-step basis. In addition, the document specifies tools that may be considered when engaging in the EIA process. Reference is made to the legislation and policies that potential investors and

developers must comply with in Ethiopia, and key issues for environmental assessment in specific development sectors are detailed for consideration.

In addition, the EIA Guideline provides the categories of projects concerning the requirement of EIA, and lists project types under each category. In this Guideline projects are categorized under three schedules:

Schedule 1: Projects which may have adverse and significant environmental impacts, and may, therefore, require full EIA.

Schedule 2: Projects whose type, scale or other relevant characteristics have potential to cause some significant environmental impacts but are not likely to warrant an environmental impact study. falls under Schedule 2.

Schedule 3: Projects which would have no impact and do not require an environmental impact assessment.

However, projects located in environmentally sensitive areas such as land prone to erosion, land prone to desertification, areas of historic or archaeological interest, scenic landscape, religiously important areas etc. should be treated as equivalent to schedule 1 activities irrespective of the nature of the project.

An initial screening of the project road has been undertaken using the EPA EIA guidelines. According to the guidelines the Konso - Yabelo road project falls under schedule 1, requiring a full EIA. The main reason being that the project is traverses through some areas categorized in the guidelines as 'environmentally sensitive areas'. These include areas with erosion-prone soils and areas prone to desertification. Also the size and scale of the project requires full scale EIA.

2.4.2 WORLD BANK SAFEGUARD POLICIES

The World Bank provides guidance on requirements in the Environmental Assessment Sourcebook, which includes recent versions of the World Bank Operational Policies as well as the updates. The World Bank has ten "Safeguard Policies" whose primary objective is to ensure that Bank operations do not cause adverse impacts and that they "do no harm". The ten safeguard policies are grouped into Environment, Rural Development, Social Development and International Law.
The following are the current World Bank Safeguard Policies that are pertinent to the development projects. There are ten "World Bank Safeguard Policies" whose primary objective is to ensure that Bank operations do not cause adverse impacts.

OP 4.01 ENVIRONMENTAL ASSESSMENT:

The core requirement of this Policy is that screening should be done as early as possible for potential impacts and select appropriate instrument to assess, minimize and mitigate potentially adverse impacts, to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts, and ensures that appropriate levels of environmental and social assessment are carried out as part of project design. It also deals with the public consultation process, and ensures that the views of PAPs and local NGOs are incorporated as early as possible for Category A and B projects. The policy also covers environmental, health, and safety (EHS) guidelines.

OP/BP 4.04 NATURAL HABITATS:

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society

and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work.

OP/BP 4.36 FORESTS:

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank assists borrowers with the establishment of environmentally appropriate, socially beneficial and economically viable forest plantations to help meet growing demands for forest goods and services.

OP 4.11 PHYSICAL CULTURAL RESOURCES:

The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, "physical cultural resources" are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. This policy applies to all projects requiring a Category A or B Environmental Assessment under OP 4.01, project located in, or in the vicinity of, recognized cultural heritage sites, and projects designed to support the management or conservation of physical cultural resources.

OP/BP 4.12 INVOLUNTARY RESETTLEMENT:

The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.

2.4.3 Standard Technical Specifications of ERA

ERA prepared the Standard Technical Specifications (2002) which specifies among others acceptable environmental standards for the preparation of the road project design and contract document. The standard under division 1600 deals with environmental protection and mitigation measures. It mainly covers landscape preservation, temporary soil erosion control, preservation of trees and shrubbery, preservation of water pollution, abatement of air, dust, noise and lighting pollution, preservation of historical, archaeological and cultural remains and clean up and disposal of waste materials. Moreover, under division 1400 it deals with accommodation, sanitary arrangements, water and other social services. These standards specified regarding the social and environmental protection have been used appropriately in the preparation of this ESIA study.

2.4.4 ERA's Environmental Procedure Manual

The environmental monitoring branch EMB of ERA, has prepared Environmental Procedures Manual (2001), which specifies the requirements and procedures for the conduct of an ESIA for road sector projects. According to this manual, projects can be classified into environmentally none critical and critical projects.

Environmentally none critical projects are projects which do not have substantial adverse effects on the biophysical environment and do not involve the displacement of people or businesses and they do not significantly increase access to the influence area of the road. This may include:

- Upgrading involving only minor realignments, no extension and no new bridges for all road class
- Rehabilitation, including reconstruction, where the widening is only a small percentage of the existing width of the travel area for all road classes
- Periodic and routine maintenance of all road classes
- Traffic management projects for all road classes

Environmentally critical projects, on the other hand, include all projects that have substantial adverse effect on the bio-physical environment and involve the displacement of people and businesses and those that significantly increase access to the influence area of the road.

It is understood by the Consultant that according to ERA's Environmental Procedure Manual the environmental assessment process to be adopted for the Konso - Yabelo Road Upgrading Project is a full EIA or the project is environmentally critical project.

2.4.5 ERA's Resettlement/ Rehabilitation Policy Framework

ERA's Resettlement/ Rehabilitation Policy Framework clarifies the principles of social impact mitigation in the process of addressing social impacts induced by road projects. The Policy Framework stresses that project affected persons (PAPs) should be consulted and compensated for adverse social impacts caused by the road project.

Regarding compensation procedures and establishing compensation rates, ERA establishes compensation committees at Woreda level within the project area comprising representatives from government offices and representatives of project affected persons. The duties of the compensation committees are to register the affected properties and the number of PAPs and determine the compensation rates.

If the dispute arises regarding the amount of compensation to be paid to the project affected persons, recourse is available to the courts. However, aggrieved PAPs will also have a chance to make their complaints to the Right of Way (ROW) agent, the consultant and finally to the compensation committee. According to ERA's policy, the most preferred option is to settle the dispute harmoniously by involving the local administration and influential persons as well as elders within the community.

2.5 Environmental Legislation

2.5.1 Environmental Protection Organs Establishment Proclamation

The objective of this Proclamation (Procl. No. 295/2002) is to assign responsibilities to separate organizations for environmental development and management activities on the one hand, and environmental protection, regulations and monitoring on the other, in order to ensure sustainable use of environmental resources, thereby avoiding possible conflicts of interest and duplication of efforts. It is also intended to establish a system that fosters coordinated but differentiated responsibilities among environmental protection agencies at federal and regional levels.

This Proclamation re-established the EPA as an autonomous public institution of the Federal Government of Ethiopia. It also empowers every competent agency to establish or designate an environmental unit (Sector Environmental Unit) that shall be responsible for co-ordination and follow-up, so that the activities of the competent agency are in harmony with this Proclamation and with other environmental protection requirements.

Furthermore, the Proclamation stated that each regional state shall establish an independent regional environmental agency or designate an existing agency that shall be based on the Ethiopian Environmental Policy and Conservation Strategy, be responsible for:

- Ensuring public participation in decision-making processes
- coordinating the formulation, implementation, review and revision of regional conservation strategies
- Undertaking environmental monitoring, protection and regulation.

2.5.2 Environmental Impact Assessment Proclamation

The main objective of this Proclamation is to make EIA mandatory for specified categories of activities undertaken either by the public or private sectors. Among other things, the proclamation defines the different legal organizations concerning Environmental Impact Assessment, outlines the contents of EIAs, and determines the duties of different parties concerning EIAs.

The general provisions of the Proclamation include:

- Implementation of any project that requires EIA, as determined in a directive, is subject to an environmental clearance or authorization from the EPA or Regional Environmental Agency (REA).
- The EPA or the relevant REA, depending on the magnitude of expected impacts, may waive the requirement for an EIA.
- Any licensing agency shall, prior to issuing an investment permit or operating license for any project, ensure that the EPA or the relevant REA has authorized its implementation.
- A licensing agency shall either suspend or cancel a license that has already been issued in the case that the EPA or the REA suspends or cancels the environmental authorization. Approval of an EIS or the granting of authorization by the EPA or the REA does not exonerate the proponent from liability for damage.

To effect this Proclamation, the EPA issued an EIA Guideline Document, which provides details of the EIA process and its requirements.

2.5.3 Environmental Pollution Control Proclamation

The law on pollution control was issued in December 2002. It was issued mainly based on the principle that each citizen has the right to have a healthy environment, as well as the obligation to protect the environment of the country.

The proclamation contains provisions for Control of Pollution, Management of Municipal Waste, and Management of Hazardous Waste, Chemical and Radioactive Substances. It also encompasses provision for the formulation of practicable Environmental Standards by the EPA, in consultation with competent agencies. Furthermore, it empowers the EPA or REA to

assign Environmental Inspectors who shall have several powers and duties to control pollution.

2.5.4 The Rural Land Administration and Land use Proclamation

The Constitution of FDRE leaves the detailed implementation of the provisions concerning use rights over rural land to be determined by subsequent specific laws to be issued at both the federal and regional levels. Accordingly, at the federal level, the Rural Land Administration and Land use Proclamation (Proclamation No.456/2005) was enacted in 2005 to further determine the land use system and use rights in the country. The Proclamation provides that land administration laws to be enacted by regions should be based on the provisions provided therein and specifies the basic principles of rural land distribution and utilization including the scope of land use right which Regional laws should grant.

Similar to the Constitution, the Proclamation provides that peasants, semi-pastoralist and pastoralists shall have the right to get rural land holding the size of which shall be determined based upon the particular conditions of the locality and free of charge. The proclamation also states that any citizen of the country who is 18 years of age or above wants to engage in agriculture for a living shall have the right to use rural land. Regarding the women, the proclamation has confirmed that women who want to engage in agriculture shall have the right to get and use rural land. As to the duration of rural land use right, the proclamation provided limitless time for peasant farmers, semi-pastoralists and pastoralists. However, duration of rural land use right of other holders left to be determined by rural land administration laws of the regions.

Concerning the acquisition of rural land by private investors, the proclamation states that giving priority to peasant/pastoralists and semi pastoralist, private investors that engaged in agricultural development activities shall have the right to use rural land in accordance with the investment policies and laws at federal and regional levels.

The proclamation also states that holder of land who is evicted for the purpose of public use shall be given compensation proportional to the development he has made on the land and the property acquired or shall be given substitute land thereon. Where the rural landholder is evicted by federal government, the rate of compensation would be determined based on the federal land administration law. Where the rural land holder is evicted by regional governments, the rate of compensation would be determined based on the rural land administration laws of the regions.

2.5.5 Oromia Rural Land Use and Administration Proclamation

Recognizing the importance of proper management and utilization of the land and land resources for sustainable agriculture and other uses in the region, the Oromia Regional Government has issued a proclamation 'Rural Land Use and Administration Proclamation'. The Proclamation defines the use, right, security and obligation of the land users in accordance with the land use and administration policy.

The Proclamation states, among other matters, that:

- Any resident of the region aged eighteen years and above, whose life depends on agriculture, has the right to get rural land free of payment.
- Governmental and non-governmental organizations, private investors and social organizations have the right to use rural land through legal process.

- The customary right of access to land for communal use like grazing, ritual ceremonies and public uses shall be maintained for both peasants and pastoralists.

2.5.6 SNNPRS Rural Land Administration and Utilization Proclamation

Recognizing the importance of proper management and utilization of the land and land resources for sustainable agriculture and other uses in the region, the Sothern Nations Nationalities and Peoples Regional State has issued a proclamation 'Rural Land Administration and Utilization Proclamation (Proclamation no. 110/2007). The Proclamation defines the use, right, security and obligation of the land users. It states among other matters that:

- Peasant farmers, pastoralists and semi-pastoralists engaged in agriculture shall have the right to get rural land freely,
- Any resident of the region, eighteen years old or more, who wants to engage in agriculture has the right to get rural land holding and use,
- Governmental and non-governmental organizations, private investors and social organizations have the right to use rural land through legal process.
- Women who want to engage in agriculture shall have the right to get and use rural land,
- Holder of rural land who is evicted for purpose of public benefit shall be given compensation in advance proportional to the development he has made on the land and properties acquired and shall be given other land. When the rural land holder is evicted by the federal government the rate of compensation would be determined based on the federal land administration laws; and when the rural land holder is evicted by regional government, the rate of compensation would be determined based on the rural land administration of the region.

The project under consideration is the federal project; hence compensation for any affected property and land would be paid according to the land and property disproportion laws of the Federal Government.

Concerning squatters, there is no specific provisions in the international guidelines. But the national and regional Rural Land Administration and Utilization Proclamations state that every citizen who is 18 and above has the right to farm land. This implies that every citizen living in each region who is age of 18 and above can officially appeal for farm land and can get it provided that there is free land to be distributed and provided that he/she hasn't got similar land before. This shows that due to the implementation of Rural Land Administration and Utilization Proclamations, the chance of occupying land by squatters is very low.

Since land use administration and utilization offices are already established at Woreda levels and some of their activities are implementing the land administration and utilization low of each region, protecting misuse of land and protecting land from squatters and illegal settlers. As a result of these and other administrative strengths currently created at Woreda levels, the chance to occupy land by squatters without the recognition of Woreda level officials and land administration and utilization office is very minimal.

2.5.7 Proclamation on Expropriation of Landholdings for Public Purposes and Payment of Compensation

Proclamation no. 455/2005 states that a landholder whose holding has been expropriated shall be entitled to payment of compensation for his property situated on the land and for permanent improvements he made to such land. The amount of compensation for property situated on the expropriated land shall be determined on the basis of replacement cost of the property.

Regarding displacement compensation, the proclamation states that a rural landholder whose landholding has been permanently expropriated shall, in addition to compensation paid for property situated on the expropriated land, be paid displacement compensation, which shall be equivalent to ten times the average annual income he secured during the five years preceding the expropriation of the land. Accordingly, the compensation for the Konso - Yabelo Road Project affected people should be effected according to this proclamation.

2.5.8 Proclamation on TRIGGERED PROC 300/2002, PROC NO. 299/2002, REGULATION 135/2007

PROC300/2002

The proclamation on Environmental pollution control No. 300/2002 is mainly based on the right of each citizen to a healthy environment, as well as on obligation to protect the environment of the country. The primary objective of the proclamation on environmental pollution control is to provide the basis from which the relevant ambient environmental standards applicable to Ethiopia can be developed , and to make the violation of these standards a punishable act . The proclamation states that the "polluter pays "principle will be applied to all persons. Under the proclamation the EPA is given the mandate for the creation of the function of the environmental inspectors. Article 7(1) of this proclamation gives the authority to ensure implementation and enforcement of environmental standards and related requirements to inspectors (to be assigned by EPA or regional environmental agencies)

PROC 299/2002

The primary aim of the Proclamation on Environmental Impact Assessment N0 299/2002 is to make EIA mandatory for specified categories of activities undertaken either by the public or private sectors , and possibly , the extension of EIA to policies plans and program in addition to the projects .

The provision of the proclamation includes:

- Project will subject to EIA and execution is subject to an environmental clearance from EPA or Regional government Environmental agency, as applies
- EPA or the regional Agency , depending on the magnitude of expected impacts, may waive the requirement of an EIA:
- All other licensing agencies shall , prior to issuing of a license that either EPA or the regional Environmental Agency has authorized implementation of the project: and
- A licensing agency shall either suspend or cancel a license that has already been issued, in case of that EPA or the regional Environmental agency suspends or cancels the environmental authorization

Procedures that must be followed in the EIA process are described in the proclamation;

- A proponent shall ensure that an environmental impact assessment is conducted and an environmental impact study report prepared by experts that meet the requirements specified under a directive issued by the authority .
- The Authority or regional environmental agency shall , after evaluating environmental impact study report by taking in to account any public comment and expert opinions
    - Approve the project without conditions and issues authorization if it is convinced that the project may not cause negatives impacts:
    - Approve the project and issues authorization with conditions that must be fulfilled in order to reduce adverse impacts to in significance: or
    - Refuse implementation of the project if the negative impact cannot be satisfactorily avoided by setting conditionality of implementation.

The authority or relevant regional governmental agency shall audit the implementation of authorized project in order to ensure compliance with all the commitments made by , or obligations imposed on , the proponent during the approval of an environmental impact study report.

(REGULATIONS NO. 135/2007)

In these regulations there are several provisions to determine the amounts of payment of compensation for property situated on landholdings expropriated for public purposes. The details are in closed in this final ESIA study report (please refer annex 9)

2.5.9 Proclamation for the Conservation, Development and Utilization of Forests

Proclamation no. 94/1994 includes provision for the conservation, development and utilization of forest resources. The objective of the proclamation is to provide the basis for sustainable utilization of the country's forest resources. The proclamation categorizes types of forest ownership (state, regional and private forests). It provides the power for designation, demarcation, and registration of forests to the Ministry of agriculture (now MoARD) and Regional Government.

One of the objectives of establishment of State forest is to conserve genetic resources and/or conserve the ecosystem. The law prohibits cutting and utilization of protected tree species such as Hagenia abyssinica (Koso Zaf), Cordia Africa (Wanza), Podocarpus falcatus (Zigiba), Prunus Africana (Tikur Inchet) and Juniperus procera (Yeabesha Tid) from either State or Regional Forests.

Sub-article 4 of article 13 of this proclamation states that prior consultation and approval is required from the appropriate regional body in order to conduct construction of any projects within federal and regional forests.

2.5.10 Research and Conservation of Cultural Heritage Proclamation

The following objectives have been given to the Research and Conservation of Cultural Heritage Authority by the proclamation no. 209/2000:

- Carry out scientific registration and supervision of Cultural Heritages so that, cultural Heritage as bearing witnesses to history, may be handed down from generation to generation;
- Protect Cultural Heritage against man-made and natural disasters;
- Enable the benefits of cultural Heritage assist in the economic and social development of the country; and
- Discover and study cultural Heritage.
- Regarding the registration of Cultural Heritage, the proclamation states that:
- Any person who holds Cultural Heritage in ownership shall get registered it in accordance with the directives issued by the Minister,
- The Authority shall register Cultural Heritage using codes appropriate for their custody and preservation; and expense incurred in connection with the registration of Cultural Heritage shall be borne by the Authority.

Regarding conservation and restoration of Cultural Heritage, the proclamation states that:

- Any conservation and restoration work on Cultural Heritage shall be carried out with the prior approval of the authority and
- Where the expenses required for the conservation and restoration are beyond the means of the owner, the government may grant the necessary assistance to cover part of such expenses.

Concerning to removal of Cultural Heritage, the proclamation states that:

- Any immovable cultural heritage may not be removed from its original site without the prior written approval of the Authority,
- Any person shall notify the authority before removing registered movable cultural Heritage from its original site, and
- About trading Cultural Heritages, it says that: no person may engage in the purchase and sale of cultural heritage for commercial purposes.

Concerning fortuitous discovery of Cultural Heritage, it states that:

- Any person who discovers any Cultural Heritage in the course of excavation connected with mining explorations, building work, road construction or other similar activities or in the course of any other fortuitous event, shall forthwith report it to the Authority, and shall protect and keep it intact until the Authority takes delivery thereof, and the Authority upon receipt of report submitted, shall take appropriate measures to examine, take delivery of, and register the Cultural Heritage so discovered
- Where the Authority fails to take appropriate measures within six months, the person who has discovered the Cultural Heritage may be released from his responsibility by submitting a written notification with a full description of the situation to the regional government officials.

- The Authority shall ensure that the appropriate reward is granted to the person who has handed over a Cultural Heritage discovered fortuitously and such person shall be entitled to reimbursement of expenses, if any, incurred in the course of discharging his duties.
- Any person who holds permit to conduct construction works in a reserved area and who discovers Cultural Heritage in the course construction activities shall stop construction and shall forthwith report it in writing to the Authority.

Accordingly, if any cultural and archeological resources are encountered during the construction process of Konso - Yabelo road, the construction contractor should immediately report it to the nearest responsible office and protect and keep it intact until responsible body handles it.

2.5.11 Proclamation to Promote the Development of Mineral Resources (Proclamation No. 52/1993)

The Proclamation No. 52/1993 is proclaimed to ensure the conservation and development of the mineral resources for the benefit of the people; and to ensure that prospecting, exploration and exploitation of mineral resources are carried out in accordance with the appropriate technology and sound principles of resource conservation and develop national expertise in the mining industry.

Among others, the proclamation gives provision about construction minerals in sub Article 1, 2 & 3 of Article 21. It states a legitimate of land, may produce and use for non commercial purpose, free of charge and without permission of the Licensing Authority, construction minerals from the area he occupies, provided that the area is not reserved or excluded areas and that he does not disturb or damage the adjacent occupant's land or property.

It further states that any person produce and use for non-commercial purpose without charge and with prior permission of the Licensing Authority, construction minerals for the construction and maintenance of roads, dams, airports, schools, hospitals and other non-commercial public works. However, the licensee shall take proper precaution not to interfere with the other legitimate occupants of the license area, the land covered by a lease and adjacent land.

If the licensee's mining operations require that the other occupant be displaced, the licensee shall attempt to negotiate the compensation payable to such occupant. If the occupant refuses to be displaced or to agree on the amount of compensation, the Licensing Authority may cause the expropriation of immovable property if any, and the eviction of such occupant on behalf of the licensee's mining operations, subject to the licensee's payment of compensation determined by the Licensing Authority.

2.6 International Conventions

In addition to national environmental legislations, the Federal Democratic Republic of Ethiopia is also a party to a number of Regional and International Conventions and Protocols on Environment. The Government has established an Environmental Protection Authority, and this Authority is designated as focal point for the implementation of these conventions and protocols. These Conventions and Protocols are as follows:

2.6.1 Convention on Biological Diversity

The Convention on Biological Diversity has three goals. These are:

- Conservation of biodiversity;
- Sustainable use of the components of biodiversity and
- Fair and equitable sharing of the benefits arising from the use of genetic resources.

The convention was ratified by Ethiopia through proclamation 98/94 on May 31, 1994.

2.6.2 Framework Convention on Climate Change

Ethiopia ratified this convention through proclamation No. 97/1994 on May 2/1994. This convention takes into account the fact that climate change has trans-boundary impacts. The basic objective of this convention is to provide for agreed limits on the release of greenhouse gases into the atmosphere so as to prevent the occurrence of climate change. It also aims to prepare countries to minimize the impact of climate change, should it occur.

2.6.3 The Vienna Convention on the Protection of the Ozone Layer

The basic objective of the Convention is to combat the negative impact on the environment and human beings resulting from ozone depleting substances by reducing the amounts released and eventually banning their commercial use through internationally agreed measures. The Montreal Protocol entered into force in 1989 to facilitate the implementation of the convention.

Ethiopia ratified and become party to the Vienna Convention and the Montreal Protocol in January 1996. The National Meteorological Services Agency has been mandated for the coordination and supervision of implementation of this convention.

2.6.4 The United Nations Conventions to Combat Desertification

The objective of the convention is to combat desertification and mitigate the effects of droughts in countries experiencing serious drought and /or desertification, particularly in Africa. Ethiopia has ratified the convention through its proclamation no. 80/1997.

2.6.5 The Basel convention

The objective of the Basel Convention is to control and regulate the trans- boundary movement of hazardous wastes. The Bamako Convention of 1991 plays a similar role at the level of the African continent.

Ethiopia ratified the Basel Convention through its Proclamation No. 357/2002. Its amendment was ratified through Proclamation No. 356/2002. The country has also ratified the Bamako Convention through Proclamation No. 355/2002.

2.6.6 The Stockholm Convention

In the year 2002, Ethiopia fully accepted and ratified the Stockholm Convention on persistent organic pollutants by Proclamation No. 279/2002 designed to ban the use of persistent organic pollutants. The Environmental Protection Authority has the full mandate to implement the convention at the national level.

2.6.7 Convention on International Trade in Endangered Species of Fauna and Flora

The objectives of the convention are to control international trade in endangered species and to ensure that international trade in non-endangered species is carried out in a manner which

ensures stable markets and economic benefits for the exporting countries as well as to control and regulate illegal trade in such non endangered species, fossils and/ or their derivatives.

Ethiopia ratified the convention through Proclamation 14/1970. The mandate to implement the convention at federal level is the responsibility of the Ethiopian Wildlife Protection and Development Organization.

2.7 Environmental Institutions

2.7.1 The Environmental Protection Authority

The Environmental Protection Authority (EPA) was re-established in October 2002, under Proclamation 295/2002, which repeals Environmental Protection Authority Establishment Proclamation No. 9/1995. The EPA is directly accountable to the Prime Minister. The objective of the Authority is to formulate policies, strategies, laws and standards which foster social and economic development in a manner that enhances the welfare of humans and the safety and sustainability of the environment, and to take the lead in ensuring the effectiveness of the process of their implementation.

Among the powers and duties given to the EPA under the above Proclamation and pertinent to the objectives are to:

- Co-ordinate measures to ensure that the environmental objectives provided for under the Constitution and the basic principles set out in the Environmental Policy of Ethiopia are realized.
- Prepare, review and update, or as necessary cause the preparation of environmental policies, strategies and laws in consultation with the competent agencies, other concerned organs and the public at large, and upon approval monitor and enforce their implementation.
- Promote or assist in the formulation of environmental protection action plans and projects and solicit support of such action plans and projects.
- Prepare directives to implement environmental protection laws and upon approval, ensure their implementation.

Thus all project proponents and executing bodies (agencies) in the country should operate in close co-operation with the EPA to ensure that proper mitigating measures are designed and implemented, especially for projects with an adverse effect on the environment. That is, an Environmental Impact Statement (EIS) should be prepared by project proponents and be examined, commented upon and approved by the EPA.

2.7.2 Sector Environmental Units

The establishment or designation of an environmental unit for every competent agency is provided for under the Environmental Protection Organs Establishment Proclamation No. 295/2002.

2.7.3 Regional Environmental Agencies

Provisions for establishing or designating Regional Environmental Agencies are also included under the Proclamation No. 295/2002. Both the regional states, Oromia and SNNP, have already established such agencies. These are the Oromia Environmental Protection Office, which was established by Proclamation No. 28/2002, and the SNNPR Environmental

Protection, Land Use and Administration Authority, which was established in January 2003. The Regional Environmental Agencies are directly accountable to their respective Regional Councils and the Regional Presidents.

2.8 Legal frame works for Public consultation and participation (PCB)

The FDRE constitution has many articles that deal with Public consultation and participation. Among those, the following are taken in to consideration in the context of the project.

- Article 43(2)acknowledges the right of the people participation and consultation with respect to polices and projects that affects them
- Article 92; guarantees the right of the people to full consultation and the expression of view in the planning and implementation of environmental policies and project that affects them

Will international (ADB, WB etc Essential Banks Group) requirements regarding the public consultation reveals that at least one round of public consultation at each planning construction and operation stage of the project to be conducted in culturally appropriate way.

3 PROJECT DESCRIPTION AND COMPONENTS

3.1 Project Description

Konso - Yabelo road is part of the road connecting Mojo - Arbaminch Trunk Road to Ageremariam - Moyale. The project road starts at about 1.5 km away from the Konso town and heads towards southeast to reach Yabelo town located in the Oromia Regional State. However, in the meantime about 5 km of the road at Yabelo town has been asphalted. This has reduced the total length of the project road by 5 km as compared to original plan.

Redefining of the project road length in accordance to the above discussion would reduce the total length of the project road from 106 km to 101 km. Of which the first 38.5 km (Konso - Brindar) is dry weather road with no drainage structures; while the remaining 64.0 km (Brindar - Yabelo) is a gravel road.

Administratively the project road links two regional states and three Woredas. The first 21 km of the Road lies in Konso Special Woreda of the SNNPR and the remaining part in Teltele and Yabelo Woredas of Borena Zone in Oromia Region. Table 3.1 shows the towns and respective locations along the project road.

Table 3.1 List of towns along Konso – Yabelo road

No.	Town Name	Location (Station)
1.	Konso	0+000
2.	Brindar	35+000
3.	Elweya	73+000
4.	Yabelo	101+000

Regarding land use, the first 20 km of the road area is mainly used for agricultural activity. The Konso people are specially known for their traditional way of terrace farming on their hill side farmlands. The land is also covered with trees and bushes though it is not densely forested. After km 20 the land cover gradually changes to grassland with sparsely grown acacia type trees and bushes. The livelihood of the inhabitants along this stretch of the road is mainly based on cattle rearing and on some agricultural activities. After km 90, as the altitude rises gradually, the land use changes to agriculture again.

3.2 Project Components

The works comprise of the upgrading of the existing earth/gravel road to a high standard gravel road with a 7-m wide carriageway inclusive of shoulders for a total length of 102.5 km between Konso and Yabelo. The gravel road shall comprise of 250-300 mm gravel wearing course with a gravel sub base of 100-150 mm. Approximately 18 km of the road will be treated with Double Bituminous Surface Treatment. It also includes construction of three major bridges and approximately 171 drainage structures comprising 61 box culverts, 32 low water bridges and precast concrete pipes.

In general, the upgrading of road requires three fundamental activities that directly or indirectly related to environment. These three fundamental aspects to upgrading the road are:

- Widening to allow passage of two-way traffic
- Construction of a durable and maintainable road pavement
- Provision of drainage structures to allow all-weather access.

Widening involves the clearance of the vegetation alongside the road, the removal of the compressible topsoil material (stockpiled for later spreading onto the side slopes), and the extraction from borrow pits of material suitable for the earthworks, except where this is available from road cuttings. Water is also required for this operation.

The road pavement works involve the extraction of selected gravel material from borrow pits, quarry areas and its incorporation into the works. Water is also required.

The structural works involve the construction of bridges and culverts at all watercourses or drainage paths intercepted by the road.

All major activities of proposed road project will result in both positive and negative adverse impacts in general where in specific form, the positive beneficial impacts that will be expected are:

- Attracting tourism industry and investment
- Creation of permanent and temporarily job opportunities and employment for local and in migrants work forces, whom come to the area.
- Improves trade and market facilities
- Affecting the transaction cost in favor of local economy
- Provides access for improvements of social services like health education water supply etc. on the other hand, though the merit of the proposed road project by far out weights its demerits it will not be free from creating the following negative adverse impacts.
- Loss of hand assets under various uses for the need of road side section, construction cap, borrow and quarry areas, crasher sites explosive storage etc.
- Displacement of people, health and safety impacts, etc

Details of impacts description with enhancement measures for beneficial impacts and mitigation measures for adverse impact are outlined and presented in section 7 & 8 of the present report while the proposed socio-environment management and mo9vitoring plans were also designed and incorporated in section 9.

In view of the above, therefore, it is anticipated that proposed road project will create job opportunities and employment for local people and in migrants who come to the area to search for the aforementioned opportunities. Accordingly, the proposed road project will create job opportunities employment for both skilled and un skilled an estimated total amount of 1500-2000 work force during an implementation period

4 DESCRIPTION OF THE PROJECT ENVIRONMENT

4.1 Physical Environment

4.1.1 Physiography

The physiography of the Konso - Yabelo Road Project is part of the Rift Valley Lakes Basin, which has diverse landforms. The project is situated in middle and lowland area, which has an elevation range of 400 m above sea level to around 1,900m.

Topographically, the project road starts at an altitude of 1350 masl and traverses through rolling and mountainous terrain for the first 16 km. It then traverses through rolling terrain up to km 25, after which the terrain is mostly flat up to km 70. The road section after km 70 traverses through flat and rolling terrain up to km 88 where the terrain changes to mountainous. The altitude reaches its highest level, 1950 masl, around km 92. The mountainous terrain continues up to km 97 while being interrupted by small stretches of rolling terrain. After km 97 the terrain becomes rolling up to km 101. The rest of the section up to the end of the project road traverses through flat terrain. The terrain classification of the project road as observed during the site visit is presented in the following table.

Table 4.1.Terrain classification of Konso – Yabelo road

Section		Terrain Class
From	To	
0+000	16+000	Mountainous
16+000	25+000	Rolling
25+000	70+000	Flat
70+000	76+000	Rolling
76+000	83+000	Flat
83+000	88+000	Rolling
88+000	97+000	Mountainous
97+000	101+000	Rolling

Source: Reconnaissance field survey, 2008

4.1.2 Geology

The general geology of the area comprises mainly intrusive rocks, Precambrian metamorphic rocks and post-rift volcanic rocks. The regional geology can be further explained as follows:

Volcanic Rocks - These are mainly post rift Miocene rocks grouped under Bulal basalt. They are fine-grained, vesicular basalt covering Konso Mountains. Shernga Rhyolites are also present in these mountains. In addition to volcanic rocks, basement rocks (mainly quartzite granulites) are present in Konso Mountains.

Alluvial Deposits - These are thick superficial soil deposits. They are mainly clayey silty soils covering the dark brown clayey soil before Brindar (approx.15 km coverage) and the flood plain after Brindar (approximately 10 km coverage). The geology around Brindar, however, is porphyritic basalt. Intrusive Rocks -These are mainly deformed granites pale pink to pinkish in colour and medium grain textured. They cover a large portion of the project area starting from a few kilometres after Birindar up to Yabelo.

Stratified Metamorphic Rocks - These are Precambrian banded (inter-layered quartzofeldspatic gneiss). These rocks make up the mountain chain starting from approx. 15km before Yabelo and extending up to Yabelo.

4.1.3 Hydrology and Drainage

The flow in the catchments is predominantly canalized. Most of the streams have well defined canals and are stabilized through time.

As the route traverses though varied relief between Konso and Yabelo it crosses a number of minor and major drainage areas. There are about 20 small and large bridges, 8 box culverts and about 80 pipe culverts.

The largest rivers are Myra, Segen and Masgerada, located at Km 14, 18 and 52 respectively. All the streams except Segen are seasonal, flowing only during the rainy season. Most of them have flows for a short duration after the rains. During the field visit on July 8/2009 the Segen River was dry. This is probably due to the exceptional draught occurred in the area.

4.1.4 Climate

The climate of the Konso area is classified as tropical climate with mean annual rainfall varying between 500 mm and 1000 mm. The elevation varies from 400 masl to around 1900 masl. As the road descends to Brindar, the climate changes to the hot semi-arid condition with mean annual rainfall ranging from 400 mm to 800 mm.

The mean annual temperature ranges from 20^{o}C to 25^{o}C in Konso and 25^{0}C to 30^{0}C in Yabelo. Daily range of temperature is high while annual range is small. The variation in the amount of solar radiation received daily is small throughout the year.

Summer being the main rainy season, temperature is reduced to some extent due to high humidity and cloud cover. Hence the highest temperatures are sometimes experienced at other periods than when the sun is overhead, or even during the low sun period. The area receives over 7 hours of bright sunshine daily for most part of the year. It is only during the summer rainy season, when there is much cloud cover, that the daily duration of sunshine is less than 5 hours.

Table. ***4.2*** Monthly Rainfall in mm at Konso Station

Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
1997	5.8	0	52.6	259.1	74.8	77.1	79.3	28.2	15		229.7	64.2	885.75
1998	111.9	126	45.1	118.3	39.8	53.9	1.5	35	40.1	120.7	32.2	0	724.05
1999	7.6	3.5	148.5	102.7	4.9	12.4	31.5	41.8	29	129.2	11.6	69.9	592.65
2000	0	0	28.3	87.1	98.2	5	25.6	18.3	17.9	133.5	37.5	68.1	519.57
2001	33.2	4.1	98.4	352	88.05	9.5	19.8	63.1	50.3	137.8	81.2	1.9	939.35
2002	43	16	86.9	112	77.9	14	0	3.4	43.1	89.6	28.2	228.7	742.5
2003	3.8	14.2	80.2	231.6	210.4	25.7	27.2	85	30.1	41.4	44	35.3	828.9
2004	33.4	13	54.2	112.6	123.3	4.9	6.2	0.3	56.3	42.1	83.5	33.2	563
2005	25	2.4	81.8	102.3	82.6	9.5	19.4	16.2	61.8	109.9	57.6	0	568.52
2006	29.2	65.9	142.2	92.05	41.9	32	5	100.3	14.6	141.2	181.8	75.4	921.55
Sum	**292.9**	**244.3**	**818.2**	**1569.7**	**841.9**	**243.9**	**215.55**	**391.6**	**358.2**	**945.5**	**787.3**	**576.7**	
Average	**29.3**	**24.4**	**81.8**	**156.9**	**84.2**	**24.4**	**21.5**	**39.2**	**35.8**	**94.5**	**78.7**	**57.67**	

Fig 4.1 Monthly mean rainfall at Konso station

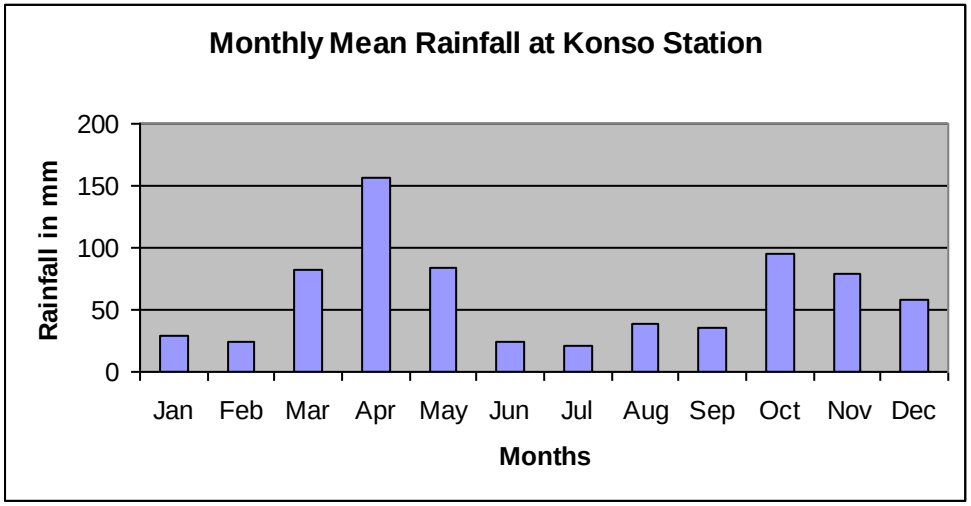
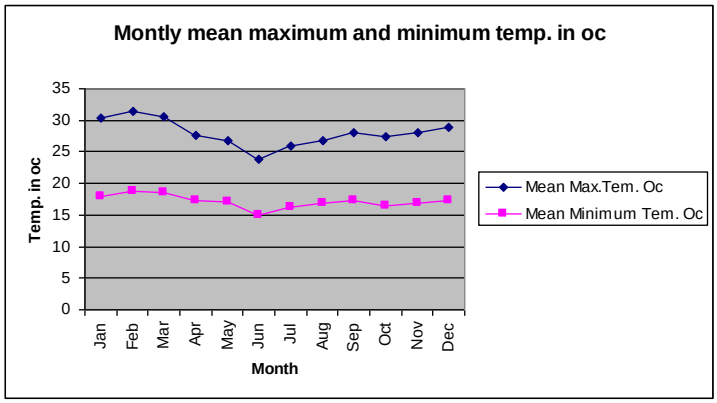


Table 4.3: Mean monthly maximum and minimum temperature of Konso - Yabelo

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Rainfall (mm)	29.29	24.43	81.82	156.9	84.19	24.39	21.55	39.16	35.82	94.55	78.7	57.67
Mean Max. Tem. ^{o}c	30.26	31.51	30.55	27.71	26.8	23.88	25.9	26.8	28.1	27.41	27.9	28.83
Mean Min. Tem. ^{o}c	17.92	18.77	18.52	17.23	17.09	14.985	16.30	16.86	17.38	16.49	16.8	17.27

Source: Meteorology Agency

Fig. 4.2 Monthly mean maximum and minimum Temperature along the project road



4.1.5 Soils, Soil Erosion and Siltation

The dominant soil type along this road is brown clayey silt. Dark brown clay soil is also present in small sections, particularly from Km 28 to Km 38 in the poorly drained plain area. Reddish brown silty clay soil is dominant in the section between Elwoya and Yabelo.

In general, soil erosion and siltation are major environmental problems in most parts of the project area. They are prominent in the section between Konso and Segen River mainly due to topography (sloping land), intensity of land use (more cultivation and less land cover), and intensity of rainfall. Natural drainage channels are mostly eroded on sloping areas and heavily silted in low-lying flat areas. Riverbank erosion and expansion is also a major problem, particularly along a major seasonal river crossing the road at Km 16. Boulders, stones and sand transported by runoff water from the hills and mountains are deposited in gently sloping sections of the river course.

The intensity of soil erosion and siltation is less prominent in the section between Segen River and Elwoya except at a few spots and some river channels. This is simply by virtue of a mostly flat topography, good vegetation cover and less intensive land use. Of drainage channels intercepted by the road, Masgerdo River at approximately Km 54 has a major problem of bank erosion and silt accumulation. It has a wide river course formed due to riverbank erosion by flood effect of concentrated runoff water from its large catchment. The severity of riverbank erosion is reflected in tree debris left on the river banks or in the river course. It is constructed with a concrete drift, which is severely eroded or scoured on the downstream side. However, the soils in a large part of the alignment, notably in the section from Km 26 to Km 38, are highly erodible, particularly where clearance of its vegetation cover and disturbance of the soil has occurred.

The section between Elwoya and Yabelo town has a major soil erosion and siltation problem. It is common to observe severe gully erosion in roadside ditches and diverting drains. In most cases, riverbanks are also severely eroded. At flatter or gentle slopes the cross and longitudinal drainage structures and natural drainage channels are heavily silted up. The erosion problem is primarily related to soil erodibility, intensity of rainfall, topography and degradation of the vegetation cover due to clearance for cultivation, settlement and heavy grazing. The process of soil erosion was speeded up by the road due to runoff interception and concentration in side ditches and diverting ditches. Scour protection measures have been constructed for some stretches of side drains in the hilly section before Yabelo. On the bituminized section from Yabelo to the main Addis - Moyale road all the culverts and a large

proportion of the side drains are silted up and require cleaning. Along this section Bermuda grass (Cynodon dactylon) has become well-established and is protecting the soil from erosion.

Photo: Soil erosion affecting the existing road at about km 76

4.2 Biological Environment

4.2.1 Vegetation and Flora - Types, Density and Floristic Composition

Ethiopia's natural vegetation is very diverse, primarily due to topographic and climatic diversity. The various vegetation types of Ethiopia have been grouped into nine major categories. These include Desert and Semi-Desert Scrubland, Acacia-Commiphora Woodland, Lowland Semi-Evergreen Forest, Combretum-Terminalia Woodland, Moist Evergreen Forest, Evergreen Scrub, Dry Evergreen Montane Forest and Montane Grassland, Afro-alpine and Sub-afro-alpine Vegetation, and Riparian and Swamp Vegetation. The country's flora is estimated to contain between 6500 and 7000 species of higher plants, of which about 12 percent are believed to be endemic (T.B. Gebre Egziabher, 1991, cited in Ethiopia - UNCED National Report, 1992).

Endemism is particularly high in the mountains, the semi-arid and arid region of the southeast (Ogaden area) and the forests of the southwest. The southeast part of Ethiopia is the most species-rich region characterized by a high diversity in Acacia, Commiphora and Boswellia species, and contains about 25% of the country's flora (Vollesen, 1986, cited in Ethiopia - UNCED National Report, 1992). According to the above general classification of Ethiopian vegetation, the vegetation of the Konso - Yabelo road alignment falls under the Desert and

Semi-Desert Scrubland vegetation type. More specific to the project sites, the former is dominantly Acacia-Commiphora Deciduous Bushland with Acacia Woodland also covering a significant part of the project area. The under storey is usually a combination of suffrutescents and grasses.

The vegetation of the project areas predominantly comprises small trees and shrubs that are adapted to tolerate droughts (moisture stress and high temperatures) by having either small deciduous leaves or leathery persistent ones. Its floristic composition is predominantly Acacia species followed by Commiphora species. The predominant trees and shrubs are *A. mellifera, A. senegal, A. tortilis, A. nilotica* and *Commiphora africana*. Other major species include *Commiphora habessinica, Grewia bicolor, Grewia* spp., *Balanites aegyptica, Zizyphus* spp., *Salvadora persica* and *Delonix elata*. There is also a high forestland along a small section of the Konso - Yabelo Road, on a mountainous area around Yabelo.

The project sites are also endowed with a rich diversity of grass species that are mostly growing both under and between the woody vegetation. The main grass species recorded from the project areas belong to the genera: *Cenchrus, Eragrostis, Panicum, Eleusine, Aristida, Sporobolus, Bothriochloa, Cynodon*, etc. The list of main plant species identified from the project sites is given in Tables 4.4. The list of some threatened endemic plant species identified from the Acacia- Commiphora vegetation type is also given in Annex 6. A more site-specific description of the vegetation type, density and species composition is given below:

Konso - Segen River (Km 0 - Km 20)*:* The vegetation of this section is predominantly open Acacia bush land and woodland. The vegetation is mostly disturbed due to widespread cultivation, livestock grazing and browsing, and human exploitation for construction materials and fuel wood. Main trees and Shrubs include *Acacia mellifera, A. nilotica, A. senegal, Commiphora sp, Delonix elata, Balanites sp, Terminalia browinii, Moringa oleifera,* and *Grewia bicolor*. Hill slopes have better vegetation density while low-lying flat or gently sloping areas are mostly cultivated for sorghum production.


Photo: *Moringa oleifera* (left) and Acacia Species (right) common tree species between Konso and Segen River

Segen River - Elwoya (Km 20 - Km 75): The vegetation in this part of the road corridor is dominantly Acacia-Commiphora bushland with Acacia woodland along some stretches, such as Km 22.6 – Km 23.2, Km 42.4 – Km 45.4, and Km 64.5 - Km 68.0, and along perennial and seasonal rivers like Segen and Masgerdo Rivers. The vegetation cover is mostly dense except

around Brindar and Elwoya villages and not much exploited except for livestock grazing and browsing. Its species composition is more or less similar to that of the Konso- Segen section but with higher diversity and density.

Vegetation clearance was observed only at and around the above-mentioned villages, and along some stretches of the road mainly for cultivation. In addition, some spots have been cleared for quarries and borrow pits to extract selected materials for the road construction. It seems that the intensity of livestock grazing in the area between Segen and Brindar is much less than that of Brindar-Elwoya section, probably due to high prevalence of cattle sleeping sickness ('Gendi') in Segen Valley.


Photo: Acacia-Commiphora bush dominantly found from ***Segen River to Elwoya***

Km 75 (Elwoya) - Km 91: Acacia woodland and bush land are the dominant vegetation. Relatively large Acacia trees (*A. tortilis* and *A. nilotica*) occur in this part of the project area. Generally the size of the trees and shrubs increases towards Yabelo, which is primarily related to increase in elevation and rainfall. However, this part of the project area is more disturbed and exploited, particularly for rangeland. The human and animal population is higher than the preceding section. Acacia spp. dominates the vegetation. Cultivation is a dominant land use near Elwoya (Km 75-78) and along Km 88 to Km 91.

Km 91 – Km 100 (Yabelo Town): This section of the road runs through a high forest, which is designated as Yabelo State Forest (Km 91 to Km 98). It is located in a mountainous area surrounding Yabelo town at a relatively higher altitude. Though it is scheduled as a protected forest, it is very disturbed and degraded due to extensive human influences, including settlements, exploitation of forest products and animal grazing. The dominant tree species in the forest is *Juniperus procera*, which is a highly demanded tree in Ethiopia for its superior quality for construction.

Photo: Yabelo state forest dominated by Juniperus procera

Yabelo - End of the Project: This part of the project corridor is extensively used for cultivation and settlement, as a result of which little natural vegetation is remaining. Roadside planted trees (Pepper tree) and living fence (Finger Euphorbia) are found along some stretches of the road.

4.2.2 Functions of Vegetation

The natural vegetation provides several economic, social and ecological functions. The livelihood of the majority of the population in the project areas is based on pastoralism, which totally depends on the exploitation of the natural vegetation for livestock production. It is the only source of feed for the livestock. The vegetation is also the only source of construction materials and fuel wood for the local community. In addition it provides several economic and social values including honey production, wild fruits having food value, ritual value, agricultural tools, cultural furniture and utensils, fumigation wood, etc. Furthermore, it is a source of incense and gum, which have a very high commercial value.

The ecological functions of vegetation include biodiversity conservation (conserving flora and fauna), guarding the soil against water and wind erosion, water conservation and stabilizing the climate. However, due to unsustainable exploitation, the natural vegetation is being seriously degraded in several parts of the project areas. All settlements have a cleared, degraded area surrounding them, extending from some hundred meters to 5km or more. The over-cutting is most serious near settlements and in more densely settled areas, particularly in Konso and Yabelo Woredas, which are extensively cut or cleared of trees and bush or highly degraded, mainly for expansion of agricultural lands.

Table 4.4: Major Plant Species identified from Konso - Yabelo Road Project area

	Scientific name	***Vernacular name***		***Family name***	***Remark***
		Oromifa	Konso		
1	*Acacia mellifera* (Vahl.)	Sigiso		Leguminosae/ Mimosoideae	Dominant
2	*Acacia nilotica* (L.) Del.	Burquqe		"	Frequent
3	*Acacia senegal* (L.) Willd.			"	Frequent
4	*Acacia tortilis* (Forssk) Hayne	Tedecha		"	Frequent
5	*Acacia brevispica* Harms				
6	*Balanites aegyptiaca* (L.) Del.	Badana	Hankalta	Balanitaceae	Common
	Moringa oleifera				
7	*Cordia* sp.			Boraginaceae	
8	*Commiphora africana* (A. Rich.) Engl.	Hamesa		Burseraceae	Frequent
9	*Commiphora terebinthina* Vollesen			"	
10	*Croton macrostachys*	Makanisa		Euphorbiaceae	In Yabelo Forest
11	*Dodonea angustifolia*		Dittatta	Sapindaceae	In Yabelo Forest
12	*Euclea schimperi*	Miessa	Maqayta	Ebenaceae	In Yabelo Forest
13	*Juniperus procera*	Hindhessa		Cupressaceae	In Yabelo Forest
14	*Sterculia rhynchocarpa*			Sterculiaceae	
15	*Delonix elata* (L.) Gamble			Caesalpinioideae	
16	*Dobera glabra* Forsk		Karsatta	Salvadoraceae	
17	*Salvadora persica* (L.)	Ade		Salvadoraceae	
18	*Grewia biclor* Hochst.	Aroresa		Tiliaceae	Frequent
19	*Grewia ferruginea* Hochst	Dheka		Tiliaceae	
20	*Grewia villosa* Hochst	Ogomdi		Tiliaceae	
21	*Tamarindus indica* L.			Fabaceae	Mostly riverine
22	*Terminalia sp.* Fresen.		Woybata	Combretaceae	
23	*Ziziphus spina-christi* L.		Koopta	Rhamnaceae	
24	*Ziziphus mauritiana*			Rhamnaceae	
25	*Sansiveira* sp.			Agavaceae	Succulent plant
26	*Aloe* sp.			Liliaceae	Succulent plant
27	*Cissus quadrangularis.* L.	Chopi		Vitaceae	Scrambling vine,

	Scientific name	***Vernacular name***		***Family name***	***Remark***
		Oromifa	Konso		
					succulent
28	*Calotropis procera*			Asclepidaceae	Along road
29	*Aristida adoensis Hochst*			Poaceae	
30	*Brachiaria* spp.			Poaceae	
31	*Bothriochloa insculpta* (Hocst. ex. A. Rich)			Poaceae	
32	*Chloris roxburghiana* Schult.			Poaceae	
33	*Coelachyrum poiflorum* Chiov.			Poaceae	
34	*Cenchrus ciliaris* (L.)			Poaceae	
35	*Cynodon dactylon* Trin.			Poaceae	
36	*Cynodon aethiopicus* Clayton			Poaceae	
37	*Digitaria velutina* (Forssk) P. Beav.			Poaceae	
38	*Dinebra retroflexa* (Vahl) Panzer			Poaceae	
39	*Eragrostis papposa* (Roem. & Schutt.) Steud.			Poaceae	
40	*Eragrostis pilosa* (L.) P. Beauv.			Poaceae	
41	*Eragrostis* spp.			Poaceae	
42	*Eleusine floccifolia* (Forssk) Spreng.	Akrima, Dagoo		Poaceae	
43	*Harpachne schimperi* Hocst. ex. A. Rich			Poaceae	
44	*Panicum atrosanguineum* A. Rich			Poaceae	
45	*Panicum infestum* Peters			Poaceae	
46	*Perotis patens* Gand			Poaceae	
47	*Sorghum* sp			Poaceae	
48	*Sporobolus africanus* (Poir.) Robyns & Tournay			Poaceae	
49	*Setaria* sp.			Poaceae	

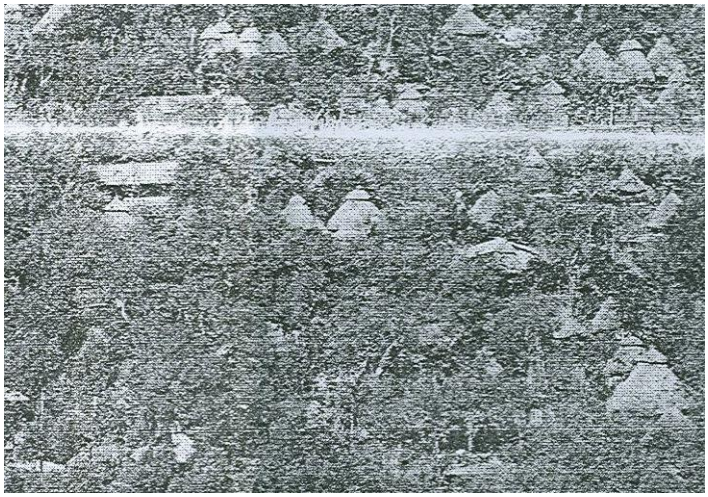
4.3 HISTORICAL, CULTURAL, ARCHEOLOGICAL, PALEONTOLOGICAL AND NATURAL SITES

Ethiopia occupies a key position in the world as home of some Historical, Cultural, Archeological, and Paleontological, sites.

Currently in the study project premises the Konso Landscape inscribed by UNESCO as the 9th world heritage site of Ethiopia

The cultural properties constituting the Konso Cultural landscapres are:-

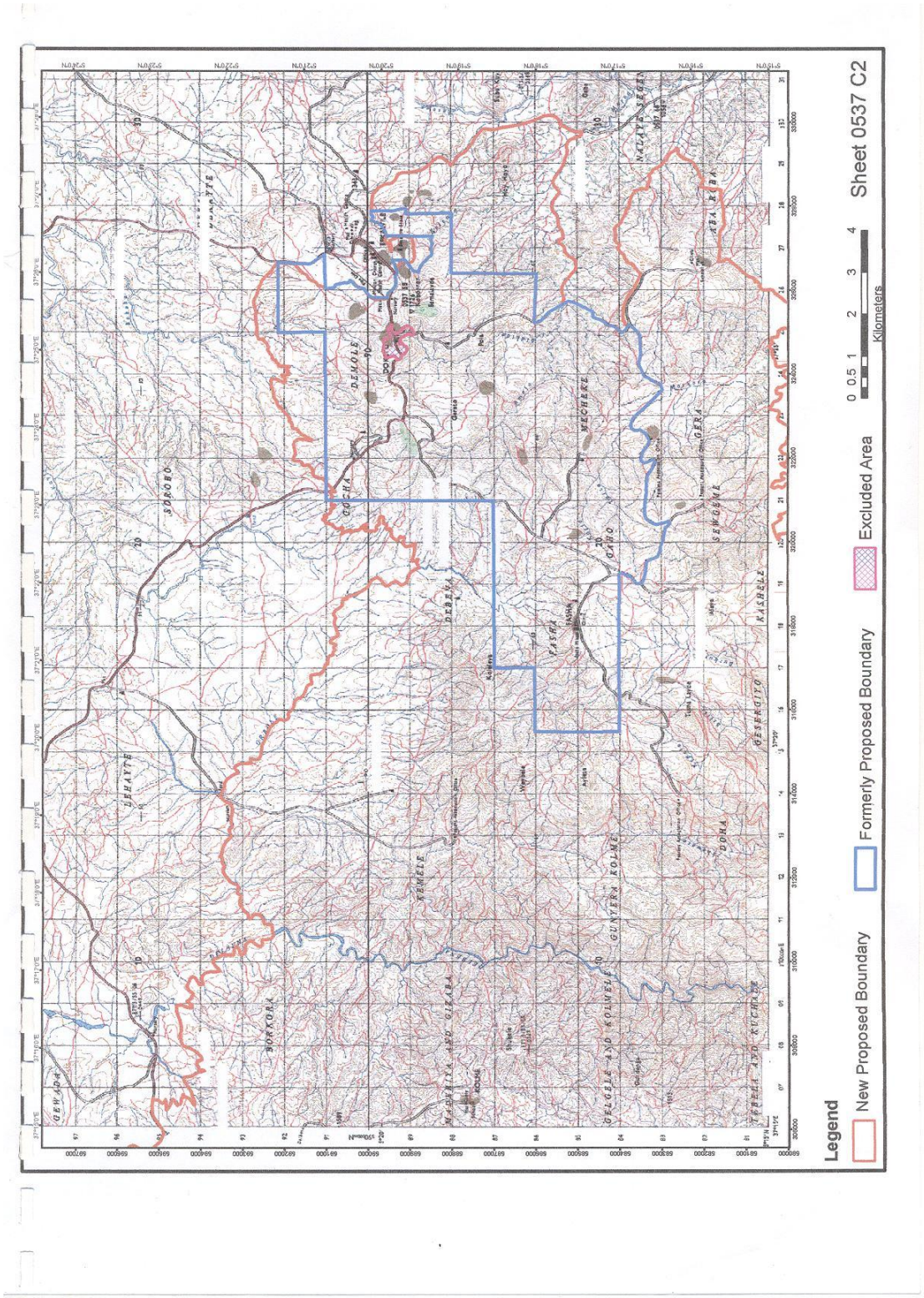
- The traditional stone walled towns (Paleta) and their organization / and associated cultural properties that is the Kanta (ward system): Mora (cultural space) with its men house (pafta)Generation marker tree (Olayta). Erect stones (Daga-hela and Daga –DRIMA)

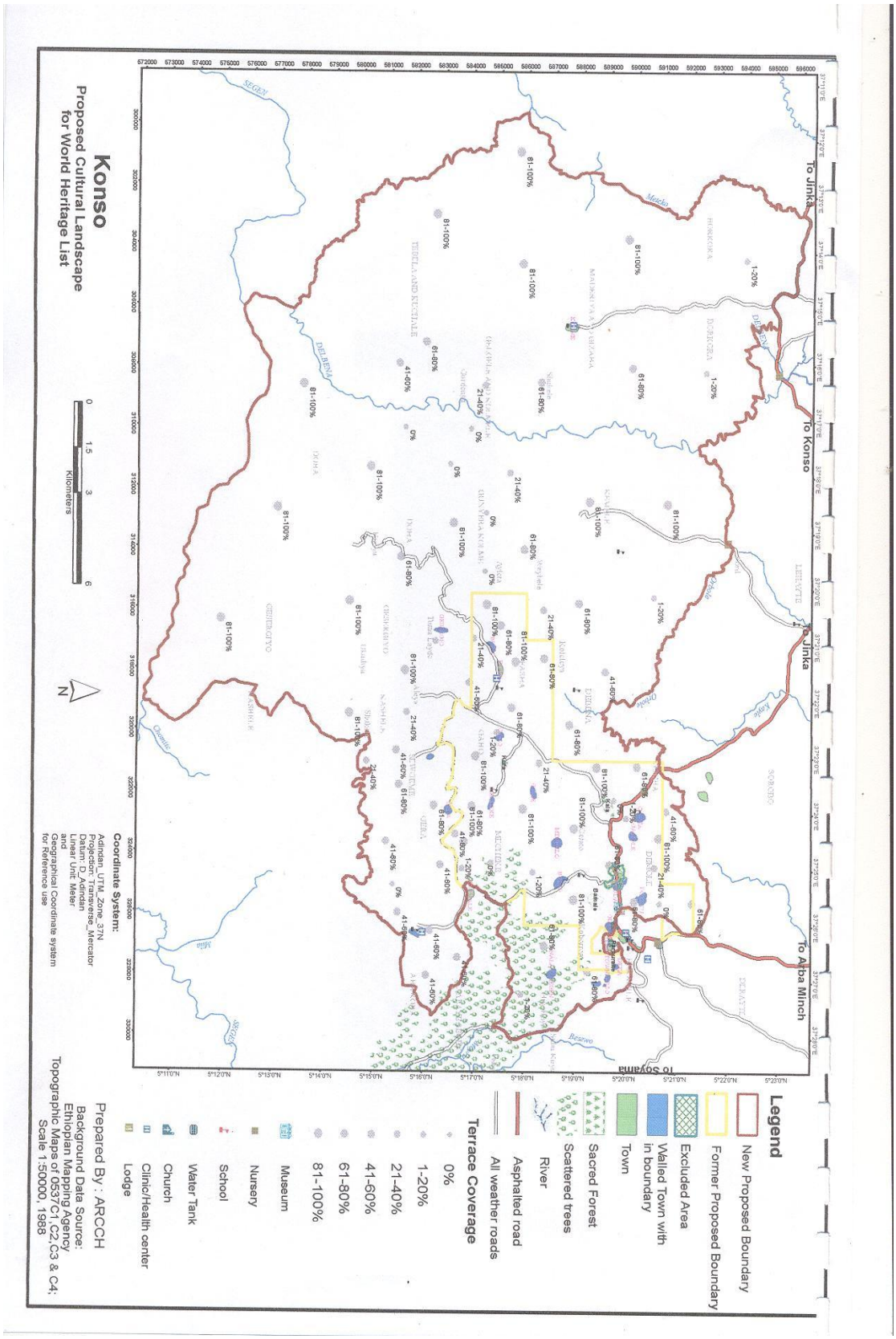


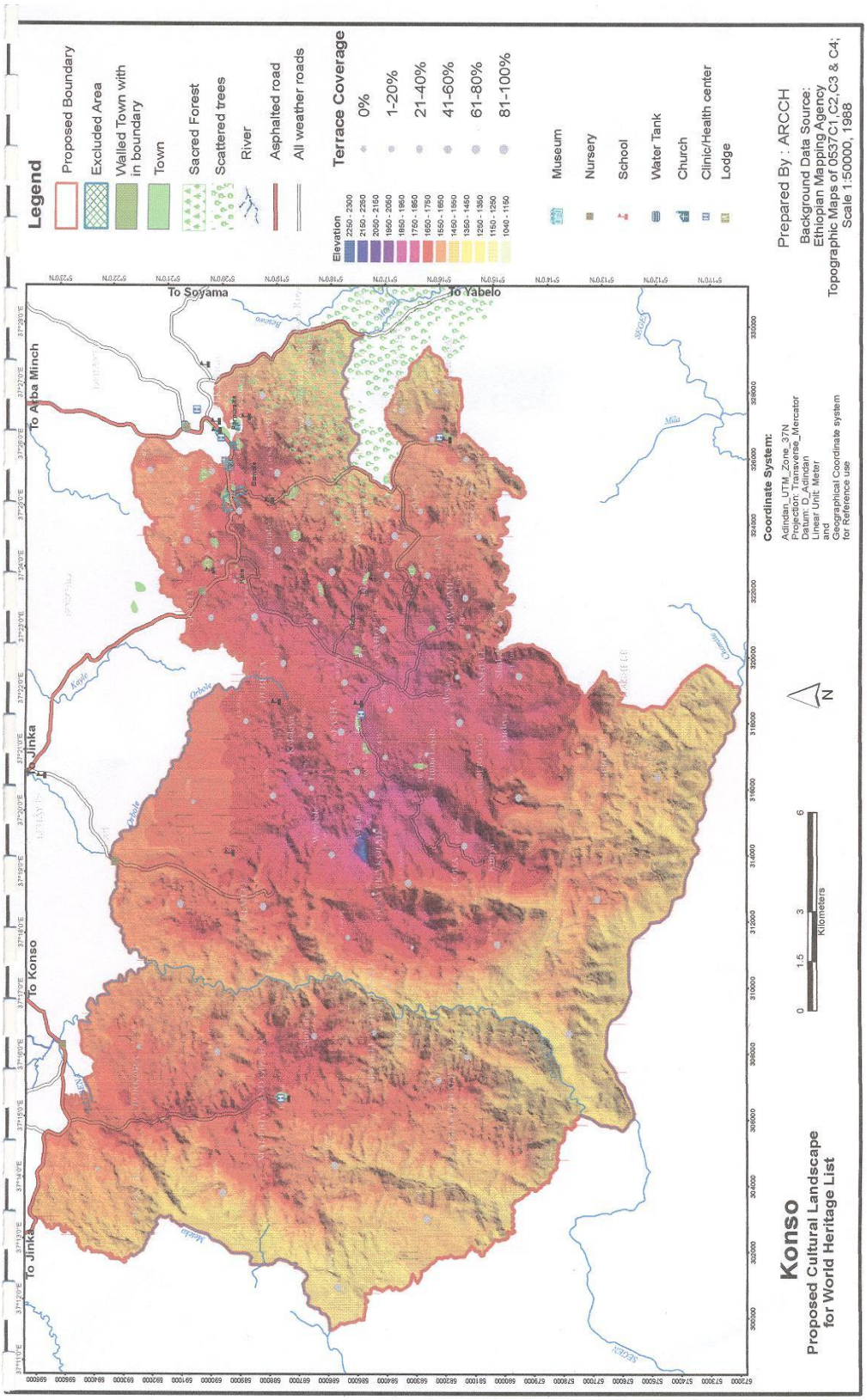
- The cultural landscape of Konso constitutes stone walled terraces that are evident along the konso-Yabello road segment towards the Kosnso side. These are spectacular living cultural traditions that stretch back to over 21 generations (400 years) and demonstrate the shared values, social cohesion and engineering knowledge of its communities to adapt to the hostile environment.

- The traditionally maintained groves (forest), which play an important role in Konso culture and serve as refuge for endemic plants.
- The burial marker statuettes (waka) , made of wood and unique to the Konso.
- The ponds (Harda), those are made with generations old knowledge and serve as response to the dry environment.

The UNESCO has made a buffer zone for these cultural heritages as shown on the following map




Konso
Proposed Cultural Landscape
for World Heritage List
To Jinka
To Konso
To Jinka
To Arba Minch
To Soyama
0
1.5
3
6
Kilometers
N
Coordinate System:
Adindan_UTM_Zone_37N
Projection: Transverse_Mercator
Datum: D_Adindan
Linear Unit: Meter
and
Geographical Coordinate system
for reference use
Prepared By : ARCCH
Background Data Source:
Ethiopian Mapping Agency
Topographic Maps of 0537C1,C2,C3 & C4;
Scale 1:50000, 1988
Legend
New Proposed Boundary
Former Proposed Boundary
Excluded Area
Walled Town with in boundary
Town
Sacred Forest
Scattered trees
River
Asphalted road
All weather roads
Terrace Coverage
0%
1-20%
21-40%
41-60%
61-80%
81-100%
Museum
Nursery
School
Water Tank
Church
Clinic/Health center
Lodge


Legend
Proposed Boundary
Excluded Area
Walled Town with in boundary
Town
Sacred Forest
Scattered trees
River
Asphalted road
All weather roads
Terrace Coverage
0%
1-20%
21-40%
41-60%
61-80%
81-100%
Elevation
2250 - 2300
2150 - 2250
2050 - 2150
1950 - 2050
1850 - 1950
1750 - 1850
1650 - 1750
1550 - 1650
1450 - 1550
1350 - 1450
1250 - 1350
1150 - 1250
1050 - 1150
Museum
Nursery
School
Water Tank
Church
Clinic/Health center
Lodge
To Soyama
To Yabelo
To Alaba Minch
To Jinka
To Konso
To Jinka
Konso
Proposed Cultural Landscape for World Heritage List
Prepared By : ARCCH
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Topographic Maps of 0537C1,C2,C3 & C4;
Scale 1:50000, 1988
Coordinate System:
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Projection Tranaverse_Mercator
Datum: D_Adindan
Linear Unit: Meter
and
Geographical Coordinate system
for Reference use
N
0
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3
6
Kilometers

As one could see from Maps the Konso – Yabelo road is a new boundary line and outside the formerly proposed buffer zone. This area has been removed from world heritage site due to previous disturbances to the site

The project and ancillary works (material and access roads) should not disturb such a landscape and even better protect it. The contractor as well as the supervision consultant should be aware of these places and protect all terraces from damage as No GO areas although not listed as heritage in this context. They have values in protecting soil from erosion and stabilizing slopes. The regional environmental agency may suspend or stop the construction work to ensure if the executions of the work are subjected to environmental mitigation measures.

4.3.1 Fauna and Wildlife Habitats

The road project is located in areas designated as a kind of wild life conservation area. The Konso - Yabelo Road is mainly located within Borena Controlled Hunting Area (CHA). In practice, the wildlife reserve and controlled hunting areas have not received any development or management attention, and they only exist as ideas on paper, with no wildlife management facilities or activities. There are no personnel from wildlife conservation organizations permanently based in the Chas. Therefore, it appears that indiscriminate hunting by the local people for subsistence and trade together with habitat degradation has severely reduced wildlife numbers. The reduction of wildlife numbers is not only related to unsustainable off-take (harvesting) but is also due to migration to neighboring countries or more remote areas.

Along this road, the Segen Valley and the area between Brindar and Elwoya have relatively important habitats and diverse wildlife. In particular, the region between Brindar (Km 38) and Elwoya (Km 75) serves as an important migration route between the Segen Valley (Segen CHA) and Satire Plain, the latter being an important wildlife area in Teltele woreda, where one of the endangered species called Burch ell's Zebra is found.

The main wild animals observed while traveling along the road and indicated by the local officials and local people to be present in the road corridor include Burch ell's Zebra, Greater Kudu, Dik-dik, Bushbuck, Oribi, Klipspringer, Gerenuk, Hyena and Baboon. Some wild animals like Lesser Kudu and Oryx, which used to live in the area, have migrated to Sarite due to human influences, especially hunting. Among the wild animals, Burchell's Zebra are the main wildlife that seasonally move between Gelana/Segen Valley and Sarite. In the dry season they migrate from Sarite to Segen in search of water and better grazing pasture, and come back in the wet season when water and fresh grass are available.

The project area is also rich in bird-life, though its species composition is not yet well studied. About 194 bird species, including three endemic ones, have been identified from the Yabelo Wildlife Sanctuary, which is very close to the project road. Among the bird species observed are Vulturine Guinea Fowl, Francolin, and White-tailed Swallow; the latter being endemic to Ethiopia. Two other endemic birds, namely Ethiopian Bush Crow and Prince Ruspoli's Touraco which are found in Yabelo Wildlife Sanctuary, might be present in the road corridor, especially in the Yabelo State Forest. Several species of other animal groups including reptiles and amphibians are also found in the area.


Photo: Baboon (left) and Guinea Fowl *(right) commonly observed along the project road*

Table 4.5: Wildlife Conservation Areas (WCAs) around the Road Project

No.	**Name of the WCA**	**Estimated Area (km^2)***
1	Yabelo Wildlife Sanctuary	2,496
2	Borena Controlled Hunting Area	45,366
3	Segen Controlled Hunting Area	

* Ethiopian Wildlife Conservation Organization (1990)

4.4 Social and Economic Environment

This section discusses the socio-economic environment of Konso - Yabelo road.

4.4.1 General description of socio-economic environment

This road passes through Konso special woreda of the SNNPR and two woredas of Borena zone in Oromia Regional State, namely Teltele and Yabelo woredas. The main town of Konso woreda is named Karat, while correspondingly, Yabelo town is the main town of the Borena zone. Based on 2007 Census result, the projected total population of the three Woreda in 2009 is 431,023. Karat and Yabelo towns together with 13 rural kebeles are considered to be within the direct Zone of Influence (ZoI) of Konso - Yabelo road.

According to PASDEP, the average time taken to arrive to the nearest all-weather road on foot or using pack animals in year 2004 was 5 hours. However, at the end of PASDEP program (2009/10) it is targeted to reduce travel time to the nearest all-weather road from 5 hours to 3.2 hours. Based on the fact that a healthy person can travel an average of 5 km per hour, traveling for 3.2 hours is nearly equivalent to 16 km. By using 16 km radius from the center of the road to both right and left direction, it is possible to calculate the direct impacted zone/area of the project road. Then, the direct project impact zone/area in sq km can easily be converted into number of people residing in the project influence area. This can be done by multiplying the average population density per km^2 (which is 23 person/km^2) by the land area. Based on this estimation, at the end of PASDEP program (2009/10) the direct beneficiaries of the proposed project road are broadly estimated to be 96,522 people.

The indigenous people within the ZoI belong to either the Konso or Oromo ethnic groups. The Oromo inhabit Teltele and Yabelo woredas, and are called the Borena-Oromo. The Konso people are basically mixed farmers while the Borena-Oromo are predominantly pastoralists. Table 4.6 below presents a summary of some basic social features for both the ZoI and the entire woredas of the area.

Table 4.6: Summary of General Features, Konso – Yabelo

No.	**Particular**	**Total ZoI**	**Entire woredas in 2009**
1	Total population	96,522	**431,023**
2	Female population - % of total	51.6	50.7
3	Average family size	5.5	5.2
4	Rural population - % of total	63	94
5	Persons per square km	23	23
6	Number of local ethnic groups	2	2

Table 4.7 Population of Woredas traversed by the project road (2007 census)

Woreda	**Total Population**			**Rural population**	**Urban population**
	Both sex	**Male**	**Female**		
Konso special Woreda	234,987	113,353	121,634	225,577	9,410
Yabelo Woreda	102,385	51,537	50,848	84,637	17,748
Teltele Woreda	69,699	35,854	33,845	64,829	4,870
Total	***407,071***	***200,744***	***206,327***	***375,043***	***32,028***

Source: Census, 2007

Table 4.8 Population of Woredas traversed by the project road, projected to 2009

Woreda	**Total population**			**Rural population**	**Urban population**
	Both sex	**Male**	**Female**	**Both sex**	**Both sex**
Konso special Woreda	248814	120023	128791	238850	9964
Yabelo Woreda	108409	54569	53840	89617	18792
Teltele Woreda	73800	37963	35836	68644	5157
Total	**431,023**	**212,556**	**218,467**	**397,111**	**33,913**

4.4.2 Bases of Subsistence and Food Crop Production

The general situation shows that cereal crop farming is, in relative terms, the principal occupation of the Konso people at large and the people within the ZoI in particular, while livestock is the main stream of the Borena-Oromo economy. The Boreas, however, do participate in crop cultivation.

The consumption of cereal grain is the main source of daily subsistence for both the Konso and Borena peoples. None of the groups, however, produce sufficient grain for their food grain requirements. The project area, on the basis of 2006/2007 production data, is food insecure. Table 4.9 below presents a summary of the food production requirement balance.

Table 4.9: Annual Food Production / Requirement Balance, Konso -Yabelo

Particulars	**Total ZoI**	**Entire Woredas**
Population	96,522	431,023
Annual cereal production (Quintals)	56,166	301,080
Annual grain food requirement (Quintals)	173,740	775,841
Food production less requirement (Quintals)	-117,574	-474,761
Production as % of requirement	32.3	38.8

Notes:

1. For ZoI only rural population is considered i.e. the population of Karat and Yabelo towns are not included for this particular case.

2. Food requirement is calculated as the minimum kilo-calories required per capita i.e. 2000/day, and corresponding grain requirement is 15 kg per person every month i.e. 1.8 Quintal per year per head.

4.4.3 Land Use and Tenure

Table 4.10 below presents a summary of land use/cover for all three woredas. The core issues of land use and tenure are briefly discussed as follows.

(i) Konso woreda

Farm land is predominantly owned and cultivated by individual farm household heads. The individual land holdings are, in most cases, very small in size, highly fragmented and degraded due to intensive cultivation. Farm land is terraced so as to conserve soil and water as much as possible. Hillsides are rehabilitated by terracing to allow them to be cultivated. The Konso people are often called farming technicians, because of their traditional soil and water conservation practices. They use blocks of locally abundant basalt interlocked with smaller blocks stabilized by soils. These terraces retain the soil from erosion and hold moisture for longer time and use for agriculture/crop production. The terraces are the main features of the Konso landscape and the hills are contoured by the stone terraces that could reach at some places up to 2 m high.


Photo: Soil and water conservation by terracing at Konso along the project road

(ii) The Borena land: Teltele and Yabelo woredas

Cropland, although it occupies a minor share, is individually owned and cultivated. Grazing land and woodland are collectively owned within a limited and maintained kinship of clan based territories. Oromia Rural Land Use and Land Administration Policy, Article No.7.14 titled pastoralism, raises the following main issues:

- The need for a policy framework on land tenure for the pastoralist people in Oromia that is different from that of the highlanders;
- The need for research on pastoral land use, management and administration;
- The need for appropriate interventions that integrate the indigenous institutions, and other grazing land development and management institutions.

Table 4.10: Land Use/Cover by Woreda (%)

No.	Land Use/Cover Type	Konso	Teltele	Yabelo	Total
1	Cultivated land	38	1	***1.5***	***5***
2	Grazing land	26	47	53.3	47
3	Unutilized arable land	12	45	11.2	19
4	Woodland	1	25	33.5	25
5	Other use/covers	23	***2***	***0.5***	***4***
6	**Sum**	**100**	**100**	**100**	**100**

Source: Each Woreda Rural and agriculture development offices

4.4.4 Labor and Employment

The Konso and Borena-Oromo people share more-or-less the same values and features in relation to gender-based division of labor among a farm family in the principal family activities. Table 4.11 below presents a summary of information gathered on the sharing of responsibility among members of a typical household, which is composed of adult and child members of both sexes.

Table 4.11: Responsibility Matrix, Konso – Yabelo

Category and Description of Major Activities			Share of Responsibility in Rank Order			
			Male Members		Female Members	
			Adult	Child	Adult	Child
Household Activities	a	*Cooking*	-	3	1	2
	b	*Water fetching*	-	3	1	2
	c	*Firewood collecting*	-	3	1	2
	d	*Washing and cleaning*	4	3	1	2
	e	*Child care*	4	3	1	2
Crop Farming	a	*Land preparation*	1	2	-	-
	b	*Sowing or planting*	1	2	3	4
	c	*Weeding*	1	4	2	3
	d	*Grading*	3	1	-	2
	e	*Harvesting / collecting*	1	2	-	3
Livestock Husbandry	a	*Herding*	3	1	-	2
	b	*Night care*	1	2	3	-
	c	*Milking*	-	3	1	2
	d	*Waste disposal / cleaning*	-	3	2	1
	e	*Health care*	1	3	2	4
Marketing	a	*Crop - bulk*	1	-	2	-
	b	*Crop - small amount*	4	3	2	2
	c	*Cattle*	1	-	2	-
	d	*Sheep / goat*	1	3	2	4
	e	*Dairy products*	-	3	1	2
	f	*Consumer goods*	-	3	1	2
Sheltering or Farmstead Construction	a	*House constructing*	1	2	4	3
	b	*Animal pen constructing*	1	2	4	3

Category and Description of Major Activities			Share of Responsibility in Rank Order			
			Male Members		Female Members	
			Adult	Child	Adult	Child
	c	*Fence constructing*	1	2	4	3
	d	*Planting farm trees*	1	2	-	3
	e	*Constructing other family facilities*	1	2	-	3

The Konso people are, both within and outside of the project area, well known for their participation in non-farm and off-farm income generating activities. These include, but are not limited to, the following:

- Traditional wood work: Vorkuta (head-rest), household utensils, various wood products used by the Borena customary chiefs (Abba-Gad) etc.
- Casual labor, within and outside of the woreda, mainly practiced by the adult male members so as to supplement family income and ensure family subsistence.
- Weaving, pottery, blacksmith and handicrafts

4.4.5 Public Health

There are four public health institutions within the road Zone of Influence:

- Karat Health Centre – Konso woreda town
- Brindar Health Post – Teltele woreda
- Elwoya Clinic – Yabelo woreda
- Yabelo Health Centre – Yabelo town.

Tables 4.12 and 4.13 below present a summary of health institutions and professionals for all three woredas. Throughout the entire target woredas, there is no medical doctors and have only one health officers, 92 nurses,5 health assistants, and 10 midwives. This shows that on average there is one health officer for every 431,023 persons, and one nurse for every 4,685 persons.

Table 4.12: Health Facilities, Konso – Yabelo

Woreda	***Hospital***	***Health center***	***Clinic***	***Health post***
Konso	-	6	8	43
Teltele	-	1	-	21
Yabelo		2	1	15
Total	***0***	***9***	***9***	***79***

Source: Each Woreda Health Office, 2009

Table 4.13: Health Professionals, Konso – Yabelo

No.	***Description***	***Konso***	***Teltele***	***Yabelo***	***Total***
1	Medical Doctors	-	-	-	***0***
2	Health Officers	-	1	-	***1***
3	Nurses	42	14	36	***92***
4	Health assistant	2	2	1	***5***

No.	*Description*	*Konso*	*Teltele*	*Yabelo*	*Total*
5	Midwives	7		3	***10***
6	Sanitarians	-	-	-	***0***
7	Lab technicians	6	-	1	***7***
9	Health extension workers	72	18	58	***148***
10	Druggists	9	-	4	***13***
11	Front line health workers	12	2		***14***
	Total	***150***	***37***	***103***	***290***

The annual report on the top ten causes of morbidity and the number of cases shows that malaria stood first, accounting for 34% of the total cases of the top ten diseases followed by Upper respiratory infection, Gastritis, Diarrhea and internal parasites, etc. Water related and water born diseases are also common. Most illnesses are communicable and are related, either directly or indirectly, to lack of adequate and safe drinking water supplies and sanitation, low living standards and poor nutrition. Table 4.14 below presents a summary of top ten diseases for all three Woredas.

Table 4.14: Top Ten Diseases and Cases July 2008- June2009, Konso – Yabelo

Rank order	**Description**	**Number of Cases**	**Share of cases %**
1	Malaria	21,089	33.9
2	Upper Respiratory Disease	10,778	17.3
3	Gastritis	6,746	10.8
4	Diarrhea	5,900	9.5
5	Intestinal Parasites	5,750	9.2
6	Skin and subcutaneous Tissue	4,000	6.4
7	Malnutrition	2,850	4.6
8	Eye Disease	2,300	3.7
9	Injuries	1560	2.5
10	Others	1214	2.0
Total		**62,187**	**100**

The future health implication of the project area that related to the road construction will be communicable diseases like HIV/AIDS and water related vector born diseases such as malaria.

Road construction activities particularly use of quarry and borrow areas would create stagnant water storage places which could serve as a potential breeding site for mosquito, the vector of malaria. Both Plasmodium falciparum and P.vivax malaria are endemic in the project area, with P.falciparum predominating. Monthly data of malaria cases registered at Konso health center shows the presence of malaria cases in all months the highest peak being in January and February (See Fig 4.3 below).

Fig 4.3: Monthly distribution of malaria cases as it registered at Konso Woreda health center (2008)

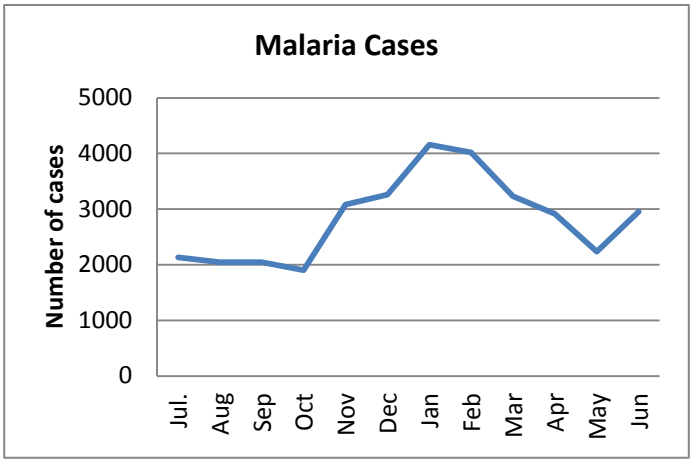
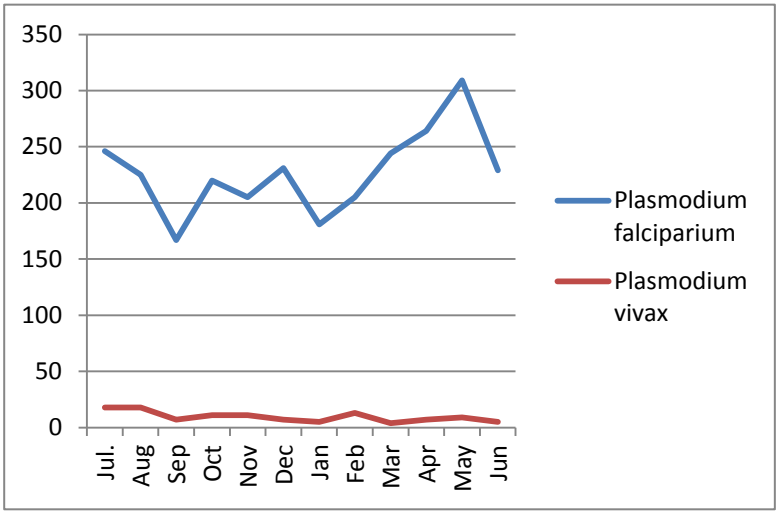


Fig 4.4: Prevalence of P.F and P.Vivax along the project road (2008)



In addition to the above health threats, HIV/AIDS is becoming serious issue in any development project areas. Hence, giving attention to prevent HIV expansion during the project plan, construction and implementation processes should be important. More interactive programmes that include education concerning the modes of spread, prevention and socio-economic implications of the disease should be addressed properly. Simple and passive dissemination of information by posters and the media would not be enough. It would be advisable to design the support services as part of the road construction project with strong and sustainable linkages with the HIV/AIDS related projects in the country. It would be worthwhile launching a sexual health awareness programme and counseling at Konso, Teltele and Yabelo health centers and support to build the capacity of the health centre.

Livestock Disease

The project area is also known for the livestock diseases. The major disease of the livestock along the project road is “gandi” which is caused by Tsetse fly. Other commonly known livestock diseases in the Woreda are CBPP (Contagious Bobbin Pluro Pneumonia), lump skin, black leg, Anthrax, Bovine Pastrolosis and internal and external parasites.

4.4.6 Education

There are more than 81 primary schools and 4 secondary schools in three Woredas crossed by the proposed road project. Tables 4.14, 4.15 and 4.16 below show the summarized distribution of schools, teachers and students.

Table 4.15: Distribution of Schools by Woreda

Particulars		**Konso**	**Teltele**	**Yabelo**	**Total**
Number of primary schools	Grade 1-4	28	12	14	54
	Grade 1-6		3	4	7
	Grade 1-8		3	2	5
	Grade 5-8	14	0	1	15
	Total primary schools	42	18	21	81
Number of secondary schools	Grade 9-10	3	0	0	3
	Grade 9-12	0	0	1	1
	Total secondary schools	**3**	**0**	**1**	**4**

Table 4.16: Distribution of Teachers by Woreda

Particulars		**Konso**	**Teltele**	**Yabelo**
Number of Teachers by sex	Male	547	77	146
	Female	165	17	41
	Total	**712**	**94**	**187**

Table 4.17: Enrolment in 2007/2008 Academic Year, Konso – Yabelo

Particulars		**Number of Enrolled Students by Sex**			**% of Female to Male**
		Male	**Female**	**Total**	
Primary School Enrolment	Grade 1-4	14,395	5,817	20,212	40.4
	Grade 5-8	6,784	2,202	8,986	32.5
	Total Primary Schools 1-8	21,179	8,019	29,198	37.9
Secondary Schools Enrolment	Grade 9-10	1,468	541	2,009	36.9
	Grade 11-12	250	89	339	35.6
	Total secondary Schools 9-12	1,718	630	2348	36.8
Grand Total Grade 1-12		**22,897**	**8,649**	**31,546**	**37.8**

4.4.7 Social Development Support Institutions and Services

The Kebele Administration (KA), mainly the rural ones, even though they are the smallest unit of local governmental organization, have poorly organized offices and facilities, or even none at all. There are three agricultural extension service centers (commonly called DA centers), one at Konso town and two in Yabelo woreda, located at Elwoya and near Yabelo town. Some of the main services offered by the DA centers are the provision of vets and training of farmers in improved crop practices and crop protection. The centers are accountable to the respective woreda offices of agriculture.

The Yabelo Woreda Office of Co-operative Organization, in collaboration with two NGOs, (CARE and AFD) is carrying out the formation of Livestock Farmers Service Co-operatives at two of the kebeles within the ZoI, namely Elwoya and Areri.

CARE and AFD (Action for Development) are the most prominent of the co-operative society organizations, undertaking various development activities at the ZoI kebeles within both Teltele and Yabelo woredas. Other organizations reported to be involved in development activities are Farm Africa at Konso, Evangelical Church Mekane Yesus (ECMY) at Konso and Yabelo woredas, and SOS Sahal at Yabelo woreda. Areas of intervention by the NGOs mentioned above are briefly outlined hereunder:

- CARE - Rural water supply, Livestock water supply
- AFD - Rural human and livestock water supply, Rural infrastructure
- ECMY - Public health care, Water shade management
- Farm Africa - Natural resource conservation
- SOS Sahal - Participatory forest management.

4.4.8 Markets and Other Social Facilities

Konso (Karat town), Elwoya, Teltele and Yabelo are the most commonly and frequently used markets for both the Konso and Borena people within the zone of influence. Exchange of livestock, food grains, consumer goods and certain cultural utensils between the Konso and Borena communities are, as stated during discussions with both community groups, of paramount importance and have been taking place over a long period of time, possibly in excess of a century.

4.4.9 Houses and Housing Facilities

The entire rural community within the ZoI lives in small traditional huts. A typical hut is made of wooden and mud walls, mud floor, roof thatched with dried straw, grass and/or reeds. A few of the rural housing units have no partition, separate cooking room, or improved stove. There is no toilet or sanitary facility, either at a household or village level. Homesteads, open fields and/or bushland are used for sanitation purpose. Firewood and in some cases crop straw are the sole sources of household energy for both cooking and light.

4.4.10 Community Structure

The Konso people live in highly congested and crowded village clusters that are located in the uplands, mainly on the right hand side of the road on the way from Konso to Yabelo, in between Karat town and Segen river. All the Konso community villages are relatively far from the existing road alignment. The Borena community at Teltele and Yabelo woredas are organized into sub-kebele units, locally called OLAs. Except for the Brindar and Elwoya semi-urban centers, none of the rural villages are located near to the current road alignment. The sites of the most social importance within the ZoI are the assembly place of the traditional administrative system (Gada), known as Arda - Jilas - Arboro, which is located about 75km from Konso on the way to Yabelo, and certain burial places near Brindar, Elwoya and Yabelo.

Photo: Burial site on the right side of the road at about km 61

4.4.11 Communication

Konso and Yabelo have telephone services. Also postal service is available in both towns Public transport connecting both towns with other major town is available.

5 ANALYSES OF ALTERNATIVES

5.1 Project Alternatives

5.1.1 Rail line

Rail line can be seen as an alternative means to solve the access and transportation problem. But constructing rail line for the purpose of connecting Konso - Yabelo area with the existing asphalt roads at both sides seems economically not feasible. This option can be seen as alternative to connect Mombasa Port with Addis Ababa through Yabelo - Konso - Arbaminch rather than connecting Konso to Yabelo.

5.1.2 Construction of Airport

Construction of airport can also be seen as an alternative to solve the transportation and connectivity problem. However, this alternative again seems not economical given the number of population and economic capacity and life standard of the people residing in the project area.

5.1.3 Upgrading of the Existing Road

Upgrading of the existing road is technically and economically feasible and socially acceptable alternative for achieving the objectives of access and transportation to the region of influence. It is assumed to be the most feasible and useful connection for alleviating the socio-economic problems of the region of influence, and for the development of the national economy. In general its role in promoting economic and social development is vital. Therefore, upgrading the existing road is the best alternative and recommendable.

5.2 Route options

The Consultant during the route review exercise has assessed route options in order to identify any alternative routes available and assess their viability. Out of the assessed five options, the consultant recommended three of them for further investigation. These are:

1. Realigning the existing alignment starting from station**74+100 to 75+100**
2. Realigning the existing alignment from station 75+100 to 77+500
3. Following the existing alignment throughout the road stretch

5.2.1 Realigning the existing road starting from station74+100 to 75+100

This realignment was proposed to avoid water course flowing parallel and near the alignment and to provide a better crossing location. However, from the environmental point of view, this option would cause adverse impacts on the existing vegetation cover and farm land. The anticipated problem, which is the expanding of water course towards the existing road is not severe and can be mitigated by applying appropriate engineering solutions and stream bank stabilization through grassing and tree plantation. Therefore, instead of realigning we recommend the road to follow the existing route.

5.2.2 Realigning the existing alignment from station 75+100 to 77+500

This realignment was proposed to avoid prominent erosion problem. As it was observed during the field visit, the existing erosion problem is mitigable by applying appropriate soil conservation measures such as terracing and tree plantation. The soil and landscape of the

proposed realignment section is also sensitive for erosion with easily erodible soil. Therefore, from the socio-environmental and economic points of view, it would be better to follow the existing route than realigning.

5.2.3 Existing Route Alignments

In terms of technical and economic feasibility, socio-economic benefits and environmental effects, following the existing route alignment is the most sound option. It is most likely that the cost of upgrading of the existing road will be much lower than constructing road with realignments. Moreover, it will be socially acceptable to adopt the present routes as they will serve the already established villages and social services, and promote the socio-economic development and improvement of the area. It is also advantageous in terms of environmental consequences, because upgrading of existing road will cause much less severe environmental effects than with new road.

Construction on the proposed alignment will not cause such environmental problems that cannot be overcome with normal good engineering practice, together with the incorporation of some environmental and social mitigation measures in the planning and execution of the project. In locating the alignment, besides the technical issues, environmental considerations will be given due attention in order to minimize adverse environmental effects.

5.3 ”NO ACTION” ALTERNATIVE

From the bio-physical environmental point of view, the ”No Action” alternative or ”without project” situation is preferable to project implementation, since it would avoid any of the negative impacts associated with the project. However, the potential socio-economic benefits to the local communities would be foregone and their existing serious socio-economic problems may remain unalleviated, and thus, their living standard may persist at low levels for an unforeseen period of time. Furthermore, the rich natural resources of the influent area may remain un-tapped and, therefore, their contribution to the regional as well as the national socio-economic development would be limited.

Therefore, implementation of the proposed road was considered as a key factor for socio-economic developments of the targeted areas. Communities residing in the project road corridor are suffering from lack of market outlets for agricultural products, access to social and economic services like health care, education and potable water, modern technology and extension services, basic commodities, etc. and would benefit substantially from improved transportation links.

In the above connection, an analysis of public consultation results at different levels and in various project targeted areas, shows strong support for the project. Hence, project implementation is preferable to the ”No Action” alternative.

6 PUBLIC CONSULTATIONS

6.1 Public Consultation during the ESIA Process

Public consultation is useful for gathering environmental data, understanding likely impacts, determining community and individual preferences, selecting project alternatives and designing viable and sustainable mitigation and compensation plans. Public consultation in the SEIA process is undertaken during the project design, implementation and initial operation. The aim is to disseminate information to interested and affected parties, solicit their views and consult on sensitive issues.

6.2 Government's Policy on Community Consultation and Participation

Public consultation and community participation are entrenched in the Constitution of Ethiopia through Articles 43 and 44.Article 43 on the Right to Development states that "Nationals have the right to participate in national development and, in particular, to be consulted with respect to policies and projects affecting their community". Article 44 on Environment Rights states that "All persons have the right to live in a clean and healthy environment".

The overall objective of the Government is to involve communities in policy formulation and implementation at the local level. The Environmental Policy seeks to ensure the empowerment and participation of the people and their organizations at all levels in environmental management activities, and to raise public awareness and promote understanding of the essential linkage between the environment and development.

6.3 The Consultation Process

The objectives of the public consultation process were as follows:

- To inform the public of the details of the proposed road construction project
- To ask local residents about problems they anticipate with the proposed project and how these can be overcome.

The consultation process at the design stage was an initial consultation. More consultations are envisaged prior to project start up and during the project's implementation and operation phases since the Government through the local administration, encourage community discussions during the implementation of development projects. The stakeholders for the proposed project were categorized as follows:

- National level stakeholders – relevant policy makers
- Regional level stakeholders – relevant policy and project implementers
- Local community in the affected woredas.

The list of persons consulted is presented in Annex 1a and 1 b.

6.4 Consultations with Local Authorities

Consultations with local authorities have been made at Konso, Teltele and Yabelo Woredas. During the consultation meeting the socio-environmental team of the project briefed the objective of the road construction project and invite the participants to express their opinion concerning the socio-environmental impacts of the project. The discussions were chaired by the heads of each Woreda administrators. The minutes of meetings are presented in Annex 2.

As it can be judged from the minutes of meeting, all the respective Woreda officials are eager to see the implementation of the proposed road project and they requested the concerning bodies to speed up the implementation of the project.


Photo: Consultation with Konso and Yabelo Woreda Authorities

6.5 Consultation with Local Community

To obtain the opinion and attitude of the community towards the road project, three Community

Group Discussions (CGD) were conducted. These were:

- Konso special Woreda at Jarso Kebele,
- Teltele Woreda at Brindar kebele,
- Yabelo Woreda at Arboro and at Elwoya kebeles

The CGD at each community took place in co-operation with and facilitated by both the woreda and local authorities. The CGD participants were selected with emphasis on their social status and representative views. No member of any CGD refused to participate and share their views and opinions on the points of discussion. The discussions and enquiries made use of an open-ended checklist, as described below.

6.5.1 Methodology for Consultation with Local Communities

Checklist / Questionnaire used for CGD

- Whether there is a need to improve the road (yes / no)
- Why the need? (problem of the existing road / any other reasons)
- Who needs the improvement? (community / organizations / merchants
- What are the expected outcomes after the intended road improvement?
- What are the expected benefits?
- What are the expected negative impacts?
- How to reduce / manage the negative impacts.

6.5.2 Results of the CGD

The main points arising from the Community Group Discussions are described in Table 6.1 below.

Table 6.1 Points arising from Community Group Discussions

Question	Response
Whether there is a need for improvement of the road.	There was no community group or member who responded negatively to the need for improvement of the project road.
Why the need for improvement?	The major reasons cited for the need for improvement of the existing road were: • The problems associated with closure of the road to traffic following any heavy rainfall; • The absence of public transport; • The absence of a bridge for crossing the Rivers
Who needs the improvement (in rank order)?	The communities. • Traders / merchants. • Tourists. • Governmental organizations and NGOs working within the areas. • Relatives of the community members who live at distant places out of the target area. • The general community within and outside the target woredas.
Expected outcomes of the improved road (ranked in order).	Improved movement of food crops to the project areas from surplus producing areas outside of the project area was mentioned as the main outcome at each CGD. • Livestock and associated products are described as the main products to be transported from and within the road areas. • Facilitation of public transportation from, within and to the areas, which is non-existent at present • Reliable transportation of consumer goods (industrial products) to and within the project areas. • The movement of development agents (governmental, NGOs, private investors), tourists and others. • Food aid in times of drought
Expected benefits to the local society	• Increased demand for, and price of, livestock and livestock products, as they can be sold at markets that are nearer to the communities. • Increased supply and reduced prices of food crops, consumer goods and implements that are imported to the project areas from distant places such as Arba Minch, Awasa, and Addis Ababa.
Expected negative	Increase in flow of illegal groups and/or individuals.

Question	Response
impacts	• Increase in illegal and/or immoral acts such as theft, robbery, adultery and woman / child abuse. • Loss of farmland, structures, trees and demolishing of houses in cases of increased road width and/or change of the existing road alignment. • Demolishing of graves and destruction of the traditional gathering fields (Ardi-Jila-gathering field) beside the Konso - Yabelo road within Teltele and Yabelo woreda territories. • Increase in car accidents after upgrading involving people, livestock and property. • Increased pressure on scarce resources, mainly during construction. • Dust pollution during the construction
Means of managing negative impacts.	Public consultation during the design, construction and post-construction phases at each and every locality as per local customs and traditions. • Public consultation during the design, construction and post-construction phases at concerning the traditional gathering field (Ardi-Jila). • Maintaining a strong relationship between the local administration of the project and the communities. • Paying appropriate compensation for the affected properties. • Priority for job opportunities to be given to community members who may lose properties due to the project. • Inter-community relationships, joint conflict-resolving. • Respect for the local communities and their customs and norms.

Photo: Consultation with local community at Konso special Woreda Jarso Kebele, Teltele Woreda at Brindar kebele, Yabelo Woreda at Arboro and at Elwoya kebele respectively

6.6 Project Disclosure

One of the mechanisms to disclose the project is conducting public consultation with the project affected people and relevant stakeholders. The public consultation is part of the ESIA study and it should be conducted at project screening and feasibility study phases of the project as we did above. Public consultations at these levels of the study are vital to disclose the type and nature of the project to directly affected people and to incorporate the public concerns, feelings and advices in the design of the project. Projects designed through such a public participation are well recognized by the public and induce the feeling of ownership. Timely disclosure of the project to the public is also important to empower the community and involve them in a project implementation process. This eventually will make the project sustainable and socially acceptable.

After the completion of the study, the summarized reports of the project study can be disclosed to the public through mass media such as radio, television and news paper. The other possible way to publicize the project is putting the report on ERA's website. Conducting workshop on the draft report could also help to disclose the project for concerning stakeholders and interested experts. Distributing copies of draft and final reports to the public relation offices at the project Woredas could play important role in disclosing the outcome of the project to the directly affected communities and Woreda level officials.

7 SOCIO-ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Road construction provides several beneficial impacts, particularly in terms of increasing the reliability of road transport and the potential to develop the local economy, there will nevertheless be some adverse impacts on the physical, biological and socio-economic environment. Therefore, the socio-environmental impacts of the Road construction were assessed using data collected from field investigations, different local and regional government offices, and a review of previous studies to identify and characterize both positive and negative impacts.

As it is evaluated, most of the negative effects will be short-term and reversible, stemming from ground disturbance, operation of equipment, construction camps and construction materials processing and storage. But, some impacts such as loss of structures will be permanent. In this section, potential positive and negative impacts have been identified and, where possible, quantified.

7.1 Positive Impacts

The construction or improvement of the proposed road enables the transport system to be improved. The role of transport in rural development is vital to rural productivity, and is also an essential social amenity, providing mobility and social interaction.

The following are among the expected environmental, economic and social benefits of the proposed road upgrading project:

7.1.1 Job Opportunity to Local People

The creation of temporary job can be considered as positive impact of the road construction to the local people. Some individuals may gain skills that can be applied in other similar construction projects too. Further direct opportunities include entrepreneurial development as a result of the increased population and increased road usage. This includes items such as commodity supplies, accommodations, restaurants, etc. The general economic improvement of the region due to the increased access and traffic flow will create further indirect job opportunities. Markets will be much more accessible, thereby providing people the opportunity to increase production and access to external markets for their products.

Enhancement Measure

This benefit can be enhanced by giving priority of job opportunity for local people, particularly for those who are going to be affected by project activities. Also putting contractual obligation on the construction contractor to use local labor for unskilled job opportunities would enhance benefit of the project to local community.

7.1.2 Improve Drainage System along the Road

Upgrading of the project road with improved design and provision of adequate and proper structures will improve drainage across and alongside the road, thereby minimizing erosion and siltation problems.

After construction, some of the quarries and borrow pits may be suitable for water harvesting and storage, and could serve as water supply points for humans and livestock, provided that their accessibility is well maintained and negative effects related to these sites are kept to the minimum.

Enhancement measure

Proper design, construction and timely cleaning and maintaining of the drainage system would enhance the benefit of the drainage system.

7.1.3 Increase Tourist Attraction

Upgrading of the road will have a positive impact on tourism development. The road connects to the southern region, which is known for its rich wildlife and diverse ethnicity with its distinguishing cultural elements. Thus, it has a high potential to attract tourists. The road will provide a shorter route for tourists coming through Kenya to the Mago, Omo and Nech Sar National Parks and other wildlife areas. The presence of endangered Burchell's Zebra at Teltele Woreda could be seen as one of the tourist attractions. Burchell's Zebra is found only in Kenya and Ethiopia and the total number is not more than 150 individuals.

Enhancement measure

Establishing tourist standard hotels at Konso and Yabelo towns, conducting advocacy work through mass Medias and pamphlets to promote the tourist attractions of the area such as Mago, Omo and Nech Sar parks and their resources. Making efforts to maintain and sustain the declining population of Burchell's Zebra. Also opening foreign exchange office at the destination of tourists would enhance tourism development to the area.

7.1.4 Create Better Access and Road Connectivity

Upgrading of the project road will complement the national road network by increasing the total length of all-weather road by about 106 km. Besides the improved national connection, in the future it may provide an alternative international connection to Kenya, which is Ethiopia's southern neighbor.

It is also clear that the road will connect Konso with Yabelo and create better access and road connectivity for the population residing within direct and indirect project road influence areas.

Construction of the road besides supporting the provision of a wider transport services, it would also create better range of government services including agricultural extension services. Improved access will increase mobility of government officials and employees, goods, materials and the resources required to run different development activities in the project road influence areas. With improved services, the living condition of the people in the road influence areas will also enhanced. When the living condition of the community improves, awareness for environmental conservation and management will also increase.

Enhancement Measure

This benefit can be enhanced by promoting the use of minibuses and carts after the completion of the road and assigning public transport permanently and employing regular road maintenance work.

7.1.5 Reduced Travel Time and Vehicle Operation Cost

Construction of standard road would improve the road condition significantly. This would be manifested by cheaper travel cost and less travel time. Also vehicle maintenance and operational costs would be greatly reduced.

Enhancement Measures

All the above benefits could be enhanced through the adoption of a high quality standard road construction and implementing routine and periodic road maintenances so that the benefits are sustained for long-term.

7.1.6 Provide Access for various Social Facilities

Constructing better road will facilitate the establishment and function of various social facilities. Access to existing infrastructures such as education and health facilities will be improved.

Information from the project area revealed that the attendance levels at schools are affected by the lack of access to schools - both for pupils and teachers. Teachers are not attracted because of the remoteness and inaccessibility of the areas. According to the information obtained from the Konso and Yabelo Woreda education offices, the main causes for the low education coverage are lack of access to the immediate learning institutions. Therefore, the implementation of the project road would encourage students to continue their education for the fact that it creates access to nearby schools. It could also help to mobilize the community for public development activities and awareness creation on the prevention of communicable diseases including HIV/AIDS and other epidemic diseases and to promote agricultural extension works which aimed at improving the livelihood of the people.

Enhancement Measures

This benefit can be enhanced by constructing other feeder roads to connect the existing facilities to main roads so as to make access for people coming from rural areas.

7.1.7 Improved Access to Markets

It is known that more than 92% of the Konso and Yabelo Woreda population are living in rural areas and the main source of income is either agriculture and/or livestock products such as butter, hide and skin. But they have no access to markets to sale their surplus products. According to the Woredas administration, the communities of the project area have faced problems of motorized transportation. On the other hand the use of non-motorized transportation often leads to the damage of goods on the way to markets and homes. Therefore, by providing better access to markets, the road construction would contribute to increase farm production and create access for the farmers to obtain inputs such as selected seeds and fertilizers and to sale their farm products at reasonable prices.

Improved access may also enhance the opportunity to utilize products of natural resources such as frankincense and natural gum. The local people and private investors can be encouraged to produce the products as they will have better market outlets for the products with better prices. It would also ensure the availability of consumer goods in diversified variety and at affordable prices.

Enhancement Measure

This benefit can be enhanced by promoting the use of carts and trucks for transporting farm products to market places.

7.1.8 Reduce Portage Burden from Women

Construction of all-weather road will reduce dependence on human portage, which benefits the female members of the communities in particular. It would also increase mobility, social communication and interaction of women both within and outside of the ZoI.

Enhancement Measures

Availing of sustainable public transport at reasonable price, would enhance the above mentioned benefit of the road construction.

7.1.9 Facilitate Humanitarian Aid

Construction of all-weather road would greatly facilitate humanitarian work in times of crises like famine, epidemic diseases (morbidity), and inter-ethnic group conflicts both within and outside of the ZoI

Enhancement Measures

This benefit can be enhanced by constructing other feeder roads to connect rural villages to the main road so as to make access for people living in remote rural areas.

7.1.10 Cultural Diffusions

The in-migrant people for job opportunities will bring both positive and negative impacts to the local people. Some of them will have different cultural backgrounds and behaviors that might not be comply with the culture of the local communities. On the other hand, the cultural diffusion that would be caused by the influx of people during and after the construction of the road project will bring more social interactions, skill transfer and other socio-cultural development to the local communities.

Enhancement Measure

This benefit can be enhanced by creating awareness among the workforce about the traditions and cultural norms of the local communities and through respecting local norms and cultures.

7.1.11 Economic Growth

With enhanced movement and accessibility along the road, the economy of people served by the road would be improved, contributing its share to the overall economic improvement of the country. Other benefits such as the reduction of vehicle operation costs and reduction of travel time would be achieved.

With the road construction, there will be good opportunities for commerce and trade to improve and provide better quality services. Moreover, lowering the costs of motorized transport may enhance a more steady supply of goods and services into the project road influence areas and facilitate the movement of agricultural products to market.

Construction of the project road will complement the national road network by increasing the total length of all-weather roads by about 106 km. These and other positive impacts would help to increase the overall economy of the people along the road influence areas and that of the country as a whole.

Enhancement Measures

This benefit can be enhanced by adopting timely maintenance of the road and construction of other feeder roads to connect the rural areas. Creating conducive environment for investors to invest in tourism, agro forestry development, irrigated farm and apiculture will also enhance

the benefit of the road. Capacity building of local offices and promoting good governess will contribute for the enhancement of the road benefits.

7.2 Negative Impacts

7.2.1 Impacts on Soils and Soil Erosion

Soil erosion is among the most serious and destructive environmental problem in most part of Ethiopia including the proposed road project area. The major factors determining the degree of soil erosion are climate, topography, soil properties, vegetation and human activities (mainly cultivation and animal grazing). Roads are important contributors to soil erosion, primarily because they concentrate and distribute runoff as channel flow rather than a uniform overland or subsurface flow. Roads also dissect fields and interrupt established drainage; at crossings they risk disrupting peak flows, accentuating backwater, and accelerating bank erosion.

Construction of Konso - Yabelo road may exacerbate soil erosion due to excavation of soil and clearance of vegetation for widening the road and construction of road embankments and poorly constructed sections. Soil disturbance and vegetation clearance will also occur due to construction of drainage structures, extraction of construction materials from quarries and borrow pits, and establishment of construction camps and material storage sites. The extent of the impact is expected to be most significant for the section between Konso and Segen river (Km 0-20) because construction of this section will require major earthworks which will involve the removal of the loose topsoil and its replacement with appropriate material. In addition, it will involve construction of new drainage structures and extraction of quite large quantities of borrows and quarry materials for the construction of the road embankment, road pavement and drainage structures. All these activities will disturb the soil and expose it to runoff erosion. Soil erosion may also be significant in the section between Elwoya and Yabelo (Km 75- Km 101) mainly because of the expected earthworks for widening of the road, and other factors such as slope, soil erodibility and high intensity of rainfall. These factors can exacerbate soil erosion unless adequate preventive and mitigative measures are implemented

The water concentrated in cross drainage structures, side ditches and diversion drains may cause severe erosion or scouring in the drainage structures themselves and in downstream areas. Besides the loss of productive soils due to water and wind erosion, and land acquisition for the road right of way, soils can be affected as a result of compaction by the passage of heavy machinery.

Dumping of unsightly spoil material from road cuttings is another negative impact. Furthermore, soils can be affected due to contamination through improper disposal of used oils and lubricants, or accidental spills or leaks from engines of machinery during construction.

Proposed mitigation measures include:

- Providing adequate and appropriate drainage mitigation structures including: _ Concrete dissipation structures designed to slow fast-running storm water in drains and culverts, and hence reduce its downstream erosive potential;
  - Diversion drains which avoid excessive concentration of flow;
  - Lined drains for the sections with erosion-vulnerable soils and slopes, examples being Km 6 to Km 15 and Elwoya - Yabelo section. and

- Provide check dams for reduce flooding by temporarily storing flood soils behind check dams (e.g Elwoya –Yabelo section)
- plantation of vativiare grass should be implemented to minimize erosion by consultation of area land use and environmental protection agency (e.g elwoya –abele section and km 6)

- Replanting (re-establishing vegetation cover) on cut-and-fill slopes, spoil disposal areas and borrow sites and other exposed areas, with appropriate tree, shrub and/or grass species at the earliest opportunity. Plant species adapted to the agro-ecology of the project areas and appropriate for erosion protection or stabilizing the soil are given in Annex 7.
- Making allowances for seasonal climatic variations, particularly rainfall, and adjusting the construction program accordingly. Cuts on erodible surfaces should be properly executed during the dry season. The best practices should be adopted to minimize the disturbance of subsoil and normal surface drainage systems.
- Land clearance should be restricted to what is absolutely necessary, avoiding clearance and excavation in soil outside the required width and the selected material sites as far as possible.
- Rehabilitating borrow and quarry areas to a natural contour, taking into consideration their drainage, and replanting the areas as soon as possible.
- All the culverts and drainage pipes should have sufficient opening to pass the design flood and to minimize scouring downstream.
- Cut-off topsoil from the road and selected material sites should be preserved for re-use on embankment slopes and for re-filling of borrow and quarry sites.
- Implementing mulching; this reduces soil erosion and increases soil moisture through run off control, increased infiltration and decreased evaporation. Mulch materials can be obtained from the vegetation and grass cleared from impact zones and left on exposed sites so as to maintain a cover on soil. Mulches retard the velocity of flowing water on soil surfaces and permit greater time for intake of water into the soil.
- Adopt periodic road maintenance and clean drainage system before the onset of rainy season

7.2.2 Slope Destabilization and Landscape Intrusion

The major variables affecting slope stability are topography, geology, vegetation, rainfall intensity and land use (human influence). In general, areas with weathered rocks, steep slopes and scarce vegetation cover are more susceptible to slope instability problems. Construction of the road project is likely to induce slope instability in a few short stretches of the road. The road section from Konso to Km 16 especially between Km 11 and Km 15, if the road follows the existing alignment, and the hilly section before Yabelo may have slope stability problems at cut and fill slopes.


Photo: Shows road slide between km 11 and 15, which require construction of retaining wall

Landscape intrusion will be related to scarring at road cuts and landscape modification due to construction of the road embankment and operation of quarries and borrow pits. As the landform changes are localized, and aesthetic value deterioration can be minimized through a restoration program, it can be considered as a minor problem.

Proposed mitigation measures include:

- Avoid side casting of spoil materials from road cuts down-slope;
- Distribute topsoil on road slopes and plant or sow appropriate plant or grass species.
- Removal of vegetation only within the borderline of construction to secure the stability of the adjoining slope to its maximum.
- Protecting vulnerable slopes, particularly those located between km 14 - 16 and km 80 - 90 by retaining walls, gabions etc; the foundation has to be drained properly to guarantee dry and stable condition for the structures.
- Carefully remove the top soils fro borrow and quarry areas and deposit at appropriate sites for re-use during reinstating of borrow and quarry areas
- Distribution of topsoil on road slopes and planting or sowing with appropriate plant species.

7.2.3 Impacts on Drainage, Water Resources and Water Supply

Road construction usually causes certain changes in natural drainage patterns and some adverse effects on the local water resources. The main impacts will likely be a change in the water velocity, flow quantities and water quality. Road construction and the activities to obtain construction materials usually modify the natural flow of surface water and drainage patterns, resulting in concentrated flows at certain points and increasing speed of flows. These changes can contribute to soil erosion, flooding, channel modification and siltation in rivers, streams and other natural drainage ways.

These impacts are already in evidence in most parts of the project areas. For example, severe gullies and/or sand accumulation inside drains and diversion drains were observed along several portions of the road, particularly in the section between Elwoya and Yabelo.

In areas of flatter topography, the road embankment can block the flow of runoff and contribute to the formation of stagnant water ponds or accumulations. Formation of stagnant water and ponds has some disadvantages, including favorable conditions for breeding of

malaria-transmitting mosquitoes, and it can contribute to deterioration of the road due to over-topping during peak storage and seepage due to prolonged stagnation.

In most places, the upgrading of the road projects, especially during the construction phase, will aggravate the existing problems. The erosion from the disturbed or exposed areas such as road cut and fill slopes, drainage structures for which excavation was carried out, borrow and quarry sites and spoil disposal sites, can result in increased sediment loading of the streams and rivers. High amounts of silt could also be collected in side ditches and transported into watercourses.

Usually road works can pose significant risks to water quality of the rivers and streams intercepted by the alignment, or the ultimate recipient water body, due to the resultant effects mentioned above. However, the rivers and streams, except for Segen river are seasonal and most of the works are expected to take place during the dry season. Therefore, during construction the impact will be small. It could, however, be significant when it rains and the exposed soils are transported to river courses through runoff.

Water is a scarce resource in most parts of the project areas. It forms an important part in human existence as well as ecological integrity. Therefore, it must be well protected in order to minimize the impacts on human existence and health as well as for ecological stability. Maximum care should be taken in abstracting water for construction purposes, particularly from small streams and ponds, which may result in a critical reduction of water in these sources. This could lead to a situation where there is inadequate water for the local users, or else its quality deteriorates due to low diluting capacity of the streams and ponds. Furthermore, spills of chemicals and pollutants as well as cement slag during construction can have adverse effects on water quality of the rivers and streams intercepted by the road.

Most of the mitigation measures proposed for erosion and slope stability also apply to impacts on water resources and drainage.

Mitigation Measure

- Avoid dumping of spoils into streams and springs
- Do not block natural flow of streams
- Do not select quarry sites in river beds and banks
- Re-grass cut areas to minimize downstream sedimentation
- Avoid polluting of rivers or streams during concreting work from cement slag
- Do not clean/wash construction equipment in to wet lands and streams
- Do not dispose fuel and lubricants into wet lands and streams. Servicing of plants, equipments and vehicles should be carried out at a workshop area. The workshop area should be equipped with secured storage areas for fuels, oils and other fluids. The storages should be constructed in such a way as to contain any spillages which may occur. Similar storage should be constructed to store used fluids prior to their disposal in a designated and authorized place. Waste oils from various plants and equipments shall be collected and send to used oil processing agency and never dispose them into wetlands, streams and rivers
- Avoid conflicting with water demands for domestic and livestock consumption & give priority for domestic and livestock consumption

- The road construction contractor should not take water from community water sources for road construction purpose if water is in short. The contractor should develop his own water source or identify reliable source to ensure noninterference with the community water use.
- Avoid locating camp sites near the water sources and ground water recharging areas.
    - Adequate pipe culverts and furrow ditches should be provided, particularly at flatter topography to allow proper passage of runoff water across the road.
    - Implementing proper disposal of solid and liquid wastes generated by construction camps, and maintaining the environmental sanitation of the campsites in good condition, is crucial.

7.2.4 Roadside Drains and Related Erosion Down Stream of the Culverts & Bridges

Usually, road construction make provision for the roadside drains which eventually directs the surface water flow with high velocity to the outlet through culverts. Due to the concentrated flow from roadside drain, the areas downstream of culverts mostly experiences erosion with gully formation (see photo below)

Photo: Erosion at the downstream of culverts due to concentrated flow at about km 77and 100

Mitigation measures

To avoid and minimize such type of erosion, it is important to install energy dissipaters or chutes at down streams of culverts. Energy dissipaters could be natural stones, concrete structures designed for this purpose or other engineering solutions. It is also important to avoid over concentration of flow by providing as many culverts as possible.

7.2.5 Impact from Un-rehabilitated Quarry sites, Borrow Areas and Detour Roads

Quarry sites, borrow areas and detour roads unless properly rehabilitated would cause environmental problems like erosion, creation of mosquito breeding site, un-aesthetic view, loss of productive land etc.

Therefore, quarry and borrow sites should be rehabilitated after the completion of the road construction. Also access and detour roads should be rehabilitated in such a way that the former use of these areas can be continued.

Mitigation Measures

- Select quarry and borrow sites far from settlement and environmentally sensitive areas and get approval from Engineer and local authorities before exploiting
- Do not select quarry and borrow sites near and at river bed and other water supply sources
- Do not locate quarry and borrow sites in a dense forest areas
- Rehabilitate all quarries and borrow sites and access roads after the completion of the road construction works
- Maintain detour roads within the ROW as much as possible
- For the purpose of rehabilitation the contractor should:
- Take photographs of the proposed borrow areas, quarry sites and detour roads before the start of exploitation
- List all the tree species found in the proposed quarry sites, borrow areas and detour roads
- Preserve top soils for reuse to refill borrow sites and quarry areas
- Do not mix top soil with base soil
- After completion of work, reinstate or refill borrow and quarry sites with the stockpiled soil
- Level by spreading the top soil uniformly over the surface
- After reinstating, plant appropriate tree species (indigenous trees) or grasses to recover the original vegetation and to improve the biodiversity and aesthetic value of these sites
- Provide proper drainage to avoid storage of water in quarry and borrow sites to reduce malarial out break through reduction of mosquito breeding sites
- The land taken for detours should be reinstated to productive state when construction is completed by removing the applied selected/foreign material, loosing compacted materials and covering with top soils

7.2.6 Air Pollution

During construction there will be localized air pollution, particularly in the vicinity of the road, borrow pits and quarry sites, due to the generation of suspended particles from earthworks for construction of the road, quarrying activities and vehicle movements on unpaved or dusty roads. In addition, with upgrading of the road, it can be expected that the vehicle emissions level will increase. These, however, are not perceived to be significant, as despite the expected increase in traffic volumes, these will still be low in absolute terms.

Proposed mitigation measures include:

- Application of good practices in construction activities and restriction of traffic speeds will minimize the dust production and its adverse effects,
- Vehicles and machinery must be kept in good condition to prevent excessive smoke from exhausts,
- Reduce dust by watering the road surface that travels through settlement areas, particularly at Konso town, Brindar village, Elwoya and at Yabelo town and at construction camp. Spray water at least three times a day,
- Locate construction plants such as stone crushing plants away from the settlement areas,
- Prevent the generation of air pollutants during the construction period by watering during crushing and screening of aggregates,
- Avoid burning of materials such as tiers, plastic, rubber products or other materials that creates heavy smock or nuisance odor, and
- Avoiding disposing of any volatile chemicals to the air.

7.2.7 Noise Nuisance

During construction, noise is generated by most of the construction activities. Construction vehicles and quarrying for construction materials will also generate noise. During the operational (post-construction) phase, an increase of noise will arise from the increase in traffic volumes. An improvement in the quality of the road may result in a decrease of noise. However, faster speeds do increase the level of noise pollution. In general, it is not envisaged that the daily traffic flow will increase to such an extent that the noise levels will present a problem.

Mitigation measures for the construction phase include:

- Construction works producing nuisance noise should be minimized or rescheduled so as not to occur at night or on locally recognized holidays or religious days.
- All machinery and plant should conform to the applicable noise standards, and plant must be provided with effective noise mufflers.
- Construction workers should adhere to health and safety standards pertaining to noise, such as wearing ear protection when operating plant or heavy machinery.
- Site noisy plants such as rock crusher should be installed far from the settlement and noise sensitive areas
- Minimize the use of explosives and promote a systematic blasting schedule
- Avoid noisy works after regular working hours at or near the residential areas

Mitigation measures for the operational phase include:

- Regular maintenance of the road to ensure road safety and to reduce the noise of vehicles negotiating potholes.

7.2.8 Impact from Stone Blasting and Vibration

Road construction activities involve blasting and other vibrations resulting from the movement of heavy machines. Particularly, explosives which could be used during rock blasting processes could cause health impact, fear and psychological problems. Also, plants

which could be installed for stone crushing and aggregate production would create vibrations and sound pollution when located near the residential areas. High level of vibration would cause cracking of buildings and affect other infrastructures.

Mitigation measures

- ❖ Stone crushing plants, quarry sites and other activities that produce high level of vibration and sound should not be located near residential areas.
- ❖ Appropriate safety measures should be taken during blasting operations.
- ❖ Safety protection materials such as goggle, helmets and masks should be distributed for the workers who involve in blasting, crashing and other related activities
- ❖ Inform nearby residents about the blasting schedules and make them aware of high sound and related vibration
- ❖ If vibration causes damage on buildings or other infrastructures, pay appropriate/ replacement compensation for the affected structures.

7.2.9 Negative Impacts on Biological Environment

Vegetation Damage and Loss of Flora

The proposed road project basically utilizes the alignment of the existing road, which have already damaged the vegetation found on the alignment. Additional damage to the natural vegetation will result from increasing of the road width, realignments and extraction of construction materials from quarries and borrow sites. Most of the vegetation within the existing right of way was cleared during the construction of the Yabelo - Teltele road and maintenance of the Konso - Brindar road section. Major alignment modifications are not expected for this road but minor improvements are expected, particularly in the section between Konso and Km 20. However, in significant stretches of the road, clearance of narrow strips of vegetation is expected due to the need to increase the road width and improve visibility for traffic safety purposes. In the section between Km 95 and Yabelo (the section that passes through Yabelo State Forest), some larger trees, particularly Juniperus trees, might have to be felled in order to widen the road width to the standard.

Additional damage to natural vegetation will result from extraction of borrow and quarry materials required for construction of the road. The proposed quarry and borrow sites are located in areas mostly covered with dense vegetation, mainly Acacia bushes and trees. Therefore, operation of those sites will cause loss of the vegetation found at those localities.

In general, the extent of damage to be caused to the vegetation and flora of the project area will not be significant or severe, but it would be important in terms of some of its functions, such as rangeland value, soil erosion protection, maintaining the climate etc. Therefore, impact minimization and restoration or compensation measures need to be implemented.

Proposed mitigation measures to minimize vegetation damage and to compensate for the losses include:

- Designing the road upgrading project so as to follow the existing road alignments as much as possible and avoid directing road alignment and detour roads wherever there is significant amount of natural vegetation, particularly where there are endangered tree species
- Reduce road right of way to the minimum

- Confining clearing of vegetation to what is absolutely necessary.
- Replanting trees and shrubs in areas adjacent to the road and at areas affected due to operation of quarries and borrow pits. Indigenous and exotic species which are environmentally friendly and adapted to the agro-ecology of the areas are proposed. The list of plant species which are proven as adaptable and appropriate for ecological and economic functions is given in **Annex 7**. Of the indigenous plants, Commiphora spp. could be the most preferred because they are best adapted, drought resistant and easy to propagate through vegetative cuttings. The project should prepare a forest/park management plan before the cutting takes place to manage the forestry/reforestation process.
- Providing a training and awareness raising programme for people involving in constructing the road, especially the operators of heavy equipment, so that they are familiarized with some key principles for conserving vegetation on the road sides and near quarry and borrow sites.
- Proper siting of construction camps and facilities i.e. not at or near areas of conservation worthy vegetation, and controlling cutting of vegetation by the construction work force.
- Controlling encroachment into conservation-worthy areas and the over-cutting of the vegetation due to activities induced by easy physical access, such as establishment of settlements, production of fuel wood and charcoal, construction work for commercial purposes, expansion of cultivation, etc.
- Introduce endangered tree species to the key personnel of the construction crew so that they can take care of them.
- Allow farmers adequate time to harvest their trees before destruction
- Transplant trees which are transplantable
- Establish a nursery at the project area to propagate and plant indigenous and endangered tree species in areas adjacent to the road and at areas affected due to operation of quarries and borrow pits.
- Plant at least 10 seedlings for each and every affected mature trees and water them
- Aware construction work force, not to cut tree for any purpose without prior approval of Environmental supervisor and local forestry department

Impacts on Fauna and Wildlife Habitats

The proposed road project doesn't traverse areas designated as strict (high priority) wildlife conservation areas such as National Parks or Wildlife Sanctuaries. However, it runs through areas scheduled as wildlife reserve and controlled hunting areas, which have no controlling or management practices. The road upgrading project will not bring any major new impacts on these wildlife conservation areas, but only minor ones. The natural vegetation areas affected due to the road construction activities (as discussed above) will reduce the available habitat. However, the affected areas are localized and very small in extent compared to the total area of the available habitats. This means the loss of wildlife habitats can be considered as merely minor.

A more important impact will be related to disruption of habitat use patterns of some wild animals, especially during the construction period. The high traffic volume and operation of heavy equipment, with more noise nuisance and frequent movements is likely to significantly

disturb the wild animals. This may cause migration of the animals away from the road and disruption of their adapted movement or migration patterns. Their mortality rate will also likely increase because of collisions with vehicles. This issue could be more important for smaller poaching may increase due to influx of human population attracted by job opportunities created by the road construction.

During the operation phase the traffic volume and speed will increase compared to the present situation. This means there will be increased impacts on wild animals, such as increased incidence of killing animals and disruption of their movements or habitat use patterns across the road or within the road corridor. However, the traffic volume is not expected to be high enough to cause significant or severe impacts on wild animals. The sections of the road which have significant wildlife population within their corridor, or which are crossed by wildlife migration routes, include Segen Valley (Km 20 - Km 33) and Km 40 - Km 70 (between Brindar and Elwoya).

Mitigation measures proposed to minimize impacts on wildlife and wildlife habitats include:

- Controlling encroachment into areas of wildlife habitats.
- Restoring affected areas (e.g. quarries and borrow pits and access roads to those sites) through a replanting program.
- Placing posters and signs in areas of wildlife to increase the awareness of road users, notably drivers, towards wildlife conservation, and to warn them not to kill animals and also to give priority to passing animals.
- Imposing speed limits in wildlife areas and migratory routes.
- Locating quarries, borrow pits, and construction camps outside the major wildlife areas.
- Designing of road with flatter side slopes in order to facilitate free movement of wild animals.
- Prohibiting the construction workforces from poaching or hunting of wildlife.
- Increasing the awareness of local communities towards wildlife conservation so that the off-take rate will be kept at minimal or acceptable levels.

Encroachment onto Ecologically Sensitive Habitats

The road project is mostly located within a semi-arid environment, which is vulnerable to erosion and desertification upon unfriendly intervention in the ecology of the areas. The vegetation of the areas, which is resistant to moisture stress, plays a critical role in stabilizing the climate and prevention of soil erosion and controlling expansion of desertification. Therefore, the project area can be considered as ecologically sensitive and an important ecosystem. The proposed road project, however, will not bring new encroachment to these ecologically important areas but may aggravate the already existing interferences.

Impacts on Rare Species

With regard to flora, a previous study showed the presence of some forty-four threatened endemic plant species of the Acacia-Commiphora woodland vegetation type, which includes the vegetation of the project areas (see Annex 6 for a detailed list). Of the plant species, eighteen species were recorded from the former Sidamo Administrative Region, which includes the Konso - Yabelo road area. Taking into consideration the agro-ecology and geographical location of the species, it is quite possible that some of these recorded or other threatened species can be found within the project areas. Considering the linear or localized

nature of the impact areas, it can be assumed that losses will most likely be of numbers in individual species, not in species themselves. Thus, the loss is most likely not one of biodiversity.

Concerning the impacts on rare fauna, there is little information on endemic or rare species in or around the project area. None of the large endemic mammals has been reported to be present in the areas to date. Three endemic bird species were recorded from the Yabelo Sanctuary. These and other endemic animal species including rare ones can be found in the project area. However, it is unlikely that there would be a significant impact on the diversity of fauna due to implementation of the project road.

7.2.10 Impacts Related to Establishment of Construction Camps

The establishment of construction camps usually causes some negative impacts on the local environment and the nearby communities. It is usually accompanied by some social and health problems that are primarily associated with the incoming population, including the road construction crews. As a large proportion of the labor force might be employed from outside, the potential problems include spreading of communicable diseases, deterioration of environmental sanitation, increased pressure on natural resources (forests & wildlife), water supply and services (mainly health facilities). The following summarizes the potential impacts of campsites:

- Land will be needed for construction of camps. The land that will be taken can be farmland or natural forest etc.
- Effluents discharged from campsites, spills of chemicals and pollutants from used fuel and oil as well as cement slag during construction can pose pollution risk to streams intercepted by the road and ground water.
- Unless campsites are suitably located, there could be a health hazard to existing towns or settlements by transmission of diseases, particularly STDs.
- The campsites may have to share limited resources like water that could be already in short supply for the residents. Overloading of existing facilities (health care, potable water supply, garbage disposal facilities) could occur.
- The campsites could affect sensitive vegetation and wildlife areas.

Mitigation measures

- Negative environmental effects can be avoided or minimized by careful siting of the camps. They should be located in an area so as to minimize the impacts on the local population, flora and fauna, water resources and drainage patterns. They should not be located at or near environmentally sensitive or vulnerable sites such as forests, settlements, watercourses, prime agricultural lands, religious sites, etc.
- All waste must be treated in a proper way and controlled by the construction supervisor. In addition, the camps should be dismantled and the areas rehabilitated as per the surrounding nature once construction is completed.
- Housing at the camps should be of sufficient quality to prevent disease-causing vectors, and adequate in number to prevent overcrowding. Furthermore, the campsites must have proper management and discipline.
- Select location of camp sites in collaboration with local authorities, RE and with EMSB of ERA

- Take photograph of the camp site before constructing any structure so that to compare the level of environmental degradation before and after the establishment of the camp site and to plan rehabilitation work.
- Establish construction campsite with appropriate and standard sanitation facilities including an imperviously lined septic tanks to reduce possible pollution impact on ground and surface water resources
- Dispose all the wastes from the camp properly in a designated and authorized places
- The contractor should take all necessary measures and precautions to avoid any nuisance or disturbance to inhabitants arising from the execution of works
- Clause should be included in the contract document that requires the contractor to take pictures of the approved sites before construction
- Tree removal from any site shall only be done with the prior knowledge of environmental supervisor team and local forestry Department,
- Maintain trees in the camp to provide shed and to increase aesthetic value
- Make workers aware about environmental sanitation and health
- Garbage disposal facilities should be provided by the contractor and the camp should remain clean all the times

7.2.11 Traffic Accident

Road and traffic safety can be a modest problem both during construction and in the operation periods. During the construction period, there will be equipment and machinery movements that could increase the risk of accidents to the local communities (particularly children) and their cattle, especially when they are crossing the road. After construction, the risk may increase due to increased traffic volume and vehicle speeds.

Mitigation Measures

- During construction, the behavior of site traffic should be controlled and properly managed by the contractor's site office in order to minimize the risks.
- Inform drivers about traffic safety before they start their jobs.
- Control traffic speeds
- Appropriate warning signs and signals should be installed on the road and anywhere necessary to ensure traffic safety during construction.
- Access to quarries and borrow pits should be prohibited for safety reasons, especially for children and animals, for example by informing the public about the issue at public gatherings and through the local administration and religious leaders
- Provide diversions with suitable and reflecting road signs; provide barricades and delineators and flagmen to guide the construction traffic. For regulation of traffic, the flagmen shall be equipped with red and green flags
- Provide alternative pedestrian routes where these are interrupted
- Use detours wherever possible
- Use clear, labeled properly and meaning full traffic signs and speed limits, especially at road crossing of the people and conjunction of animals

- Provide traffic awareness, specially at schools, mosques, churches and other places
- Assign temporary traffic controllers to regulate the passage of construction vehicles
- After the execution of the road project, mitigation measures will have to be provided to counteract increased vehicle speeds through villages and towns,
- Notice places having poor visibility and difficult terrain, by means of hazard markings and signing.
- Maintain good visibility wherever possible.
- Inform the local people as how to behave with motor vehicles. Furthermore, traffic inspection by local police is required to ensure traffic safety.
- Since the project area is rich in livestock resources, delineating or putting appropriate signs on livestock crossing areas would help to minimize traffic accidents
- Reflective traffic signs should be provided for sharp curves, winding sections, and steep grades, and animal crossing areas, junctions at major towns & villages and town entry and for speed regulation purpose.
- Guidepost should be provided on approaches to bridges (5 posts on each side, a total 20 posts for one bridge), at each corner of box and slab culverts (4 posts), on horizontal curves with fill heights over 2m and on straight sections where fills are over 3m (every 20m).
- Temporary fencing around proposed and selected quarry areas borrow pit and holes sites as well as, associated opportunity activity areas should be constructed as a safety measures to prevent accidents assumed to be occurred for local people who are not working on the proposed sites of the project road activities but could have access to accidents. Also fencing is a paramount important as safety measures a round above mentioned project road activity for gated areas depending on their location and size to prevent the movement of animals and cars including other motorized system of transportation in to the areas.

7.2.12 Loss and/or Disturbance of Farmland

Any change of alignment width of the existing road and construction of detours or access roads within the road section at Konso woreda would result in loss of significant crop land by community members who own and cultivate land along the route of the road. Farm land is vital for any household among the Konso people. Loss of a plot of land involves, for a Konso farmer, loss of farm terraces that have been established over a lengthy period of time during which the soil fertility and moisture has been fostered, and loss of farm trees that have fundamental importance to the family wood supply and cash income generation.

Based on the ERA's standard specification, the proposed road is **DS5** which requires 50 m ROW. If we consider 50m ROW as it is stated in the specification, the estimated farm land to be taken will be 85 ha. On the other hand if we assume that 30 m ROW is adequate for the widening of the road, the farm land to be taken would be 45 ha. Table 7.1 shows the existing land use in the project Road Right of Way (ROW).

Table 7.1 Land use within the Road Right of Way

Land use type	**Area in ha assuming 30 m ROW**	**Area in ha assuming 50 m ROW**
Farm land	45	85
Bush /grazing land	175	334
Settlement area	6.2	12
Total	**226.2**	**431**

Loss of productive land could also occur due to the location of camp site, crasher plant, quarry sites and borrow areas. The estimated land requirement for the contractor and consultant's camp site is about 10 ha. Including the land requirement for explosive storage, crasher plant, borrow and quarry areas, the total land requirement excluding land area needed for road widening is about 30.5.ha.Table7.2 below summarizes the land requirement for various purposes of the project.

Table 7.2 Land requirement for various purposes of the project road construction

Land use type	**Land required for**	**Area of land to be taken in Hectares, assuming right-of-way width of**		**Land ownership**	**Remark**
		30m	**50m**		
Farm land	Road widening	45	85	Individual farmers	Land to land compensation could be possible for Teltele and Yabelo Woredas, but the same is not possible in Konso as there is shortage of farm land. For the latter, there could be cash compensation instead.
Bush/ grazing land	Road widening	175	334	communal	Compensation may or may not be required
Farm or grazing land	Construction camp	10	10	Individual/ communal	Compensation may or may not be required depending on its location
Bush/grazing land	Borrow and quarry area	15	15	Individual/ communal	Compensation may not be required
Bush/grazing /farm land	Crasher site	5	5	Individual/ communal	Compensation may or may not be required depending on its location
Bush/grazing /farm land	Explosive storage	0.5	0.5	Individual/ communal	Compensation may or may not be required depending on its location
Estimated total		**205.5**	**449.5**		

Widening of the road will also affect some important fruit and commercial trees grown on both sides of the road. This impact will occur mainly at Konso woreda between km 0.00 and

km17. The major economically important trees going to be affected in this stretch of the road include: Maringa, Mango, Terminalia brownii and one set of banana.

Table 7.3 Number of fruit and commercial trees situated in the ROW

Fruit/tree type	**Number of trees within 30 m ROW**	**Number of trees within 50 m ROW**
Mango	4	6
Moringa/Shiferaw	54	96
Terminalia	13	20
Banana	1set	1set


Photo: Moringa and mango trees on the road side at about km 7+000

Mitigation measures

- Per the requirements in the Resettlement Action Plan, pay compensation either in form of land or money for the lost of land and production
- Minimize land areas required for each component during the road construction
- Minimize road right of way to 30m or less
- Stockpile top soils from borrow areas, quarry sites, access roads to use during rehabilitation work
- Rehabilitate all the land after the completion of road construction in such a way that it continues giving the interrupted services by refilling stockpile, loosening the compacted soils ,leveling and removing foreign materials, etc,

7.2.13 Health Threat

One of the prevalent diseases along the project road is malaria. Its impact would be more severe in the lowland section along the project road. This will also be a problem for the construction crews provided that the labor camp is located in the lowland portion of the project road. The other issues that will threaten the health of the communities and the construction crew are HIV/AIDS and other sexually transmitted diseases (STD). The spread of these diseases can be exacerbated by imported labor, which may have been exposed prior to coming to the project area.

From the viewpoint of public health, the construction crews and the campsite areas are the main concern particularly in relation to the expansion of HIV/AIDS and STD. It is common among construction crews to find that a high proportion of the young workers have been

exposed to and infected with such diseases and the risk of transfer to others is similarly high. There will also be more health problems associated with construction activities such as accidents from traffic or working machines, explosives, etc.

Mitigation measures

- Do not induce malaria out break by creating temporary & permanent water holding areas which favor mosquito breeding
- Use chemically treated mosquito nets in times of malaria out break and provide a clinic or medical facilities at the construction camp
- Restore borrow pits and quarry areas to minimize breeding sites for mosquito
- Minimize dust emission by watering the road during construction
- Store any explosives and chemicals in a safe place and make notification during blasting activities
- Take care when selecting campsites in such a way that it should not invite close interaction with local community.
- Provide safe water supply & appropriate waste disposal facilities including the provision of sanitary latrines in the construction camp
- Put visible and appropriate warning signs on the road during road construction including speed limits
- Provide health education mainly focusing on the HIV transmission and prevention
- Avoid discrimination in work places due to HIV/AIDS and provide counseling service
- Provide free counseling and distribute condoms & leaflets to workforce and vulnerable group of nearby communities
- Provide education to personnel of the contractor about safety procedures and emergency response plans associated with their task

7.2.14 Impact of the Project on HIV/AIDS

Ethiopia is among the countries most heavily affected by the HIV/AIDS epidemic. Hence, the response to the AIDS epidemic remains a priority issue on Ethiopia's development agenda. HIV is one of the components of the national plan for acceleration development to end poverty (Ethiopia's Poverty Reduction Strategy Paper). According to UNAIDS report on 'Ethiopia - Country Situation Analysis', in the last two years, strong leadership on the part of the Ministry of Health has been visible strengthening of the response of AIDS, in particular within the health sector. In all regions of the country, availability of voluntary counseling and testing and antiretroviral therapy is gradually increasing. However, effort needs to be put into strengthening the capacity of the health sector to deliver other HIV-related services. Effort also needs to be invested in building the capacity of other sectors in order to mainstream AIDS into their core activities. Special emphasis is required on strengthening the capacity of civil society.

The report indicated that people most likely to be exposed to HIV include sex workers, road construction workers, personnel in uniformed services, farmers, migrant workers and long-distance transportation workers. In the general population, significant HIV transmission is observed in young people aged 15-24 years; girls are especially likely to be exposed to HIV, due to harmful traditional practices, early marriage (often cross-generational and often ending

in divorce), female genital mutilation, abduction and violence. The underlying factors contributing to the spread of HIV are poverty, a high rate of unemployment, widespread sex work, gender disparity, rural to urban migration, and harmful traditional practices.

As a means to combat HIV/AIDS at road construction project places, ERA has been promoting awareness creation programs. The table below presents an action plan to prevent the expansion of HIV/AIDS at the proposed road construction work place,

Table 7.4: Plan for Awareness Campaign and Prevention of HIV/AIDS

Project Stage	Location	Action Theme	Action Components	Implementation Responsibility	Overseeing Responsibility	Source of Funding
Project Implementation	Construction Camp	Awareness Campaign	Put education posters and flyers on HIV/AIDS using local language at the public gathering locations.	NGO/Experienced sub consultant	Project Woreda health office in collaboration with ERA	HIV/AIDS Budget
	Project Site	Prevention	Condom Dispensing	NGO/Experienced sub consultant	Project Woreda health office	HIV/AIDS Budget
		Awareness Campaign, Prevention	Signing/hoardings	NGO/Experienced sub consultant	Project Woreda health office in collaboration with ERA	HIV/AIDS Budget
			Advertisements			
			Referral services			
			Social marketing of condoms			
	Immediate surroundings of the Project locations	Awareness Campaign, Prevention	Put education posters and flyers on HIV/AIDS using local language at the public gathering locations.	NGO/Experienced sub consultant	Project Woreda health office in collaboration with ERA	HIV/AIDS Budget

7.2.15 Occupational Safety Problems

During construction work, more occupational safety problems will be anticipated that associated with construction activities such as accidents from traffic or working machines, explosives, construction dust, chemicals, rock falls, disputes etc.

Mitigation measures

- Store any explosives and chemicals in a safe place and make notification during blasting activities
- Distribute goggles, helmets and other masks for the workers who directly involved in explosives, stone crashing and other similar activities,
- Minimize dust emission by watering the road during construction
- Provide first-aid and clinics in the work places and main construction camps

- Put visible and appropriate warning signs on the road during road construction including speed limits
- Provide education to personnel of the contractor about safety procedures and emergency response plans associated with their task
- The project construction contractor provide appropriate safety instruments in trenching and elevated works required sites including bridge constructions goggles, helmets safety belts and other necessary fall protection instruments should be provided for the workers. Provide appropriately designed trench in and elevated work machines to prevent adverse impacts assumed to be occurred for project road work in trenching and elevated work required sites including bridge construction.

7.2.16 Impact on the Aesthetic Value

Spoil disposal areas, waste soil and salvages could create negative visual impacts unless properly managed. Therefore, spoil disposal sites should be located as far as possible in unproductive land with preference being given to back filling quarry or borrow sites, which has been developed by the construction process and finally it has to be leveled and grassed.

Mitigation measures

- Dispose solid as well as liquid wastes properly in a designated place
- Re- grade borrow and quarry sites and plant trees, preferably indigenous trees
- Re -grade road side cuts and grass them
- Locate spoil disposal site in unproductive land or use it to fill borrow and quarry sites
- Level any spoil disposal site & grass them.

7.2.17 Induced Development Impacts

There may be negative induced development along the road project and in the road influencing areas. The improved transport services can largely induce effects, such as unplanned resource exploitation, environmental degradation and uncontrolled expansion of settlements and squatter businesses along the road; and as a consequence there will be rapid change of small villages into small towns. These may cause changes in land acquisition, market prices, population growth and high demands for economic, infrastructures and other social service. In such circumstances, unemployment problems that would be related to prostitution, sexual transmitted disease including the HIV /AIDS and various crimes would be induced in the area.

Mitigation measure

Local officials should control the project induced and unplanned growth of small villages all along the road, and create awareness among local people about HIV/AIDS prevention and should control the development of unplanned activities.

7.2.18 Impact from Immigrant Workers

Migrant workers can potentially cause personal conflicts with local workers. More cash with migrant workers will tend to inflate local prices and compete for the limited resources, which eventually cause bad feelings with local population. Some immigrant as well as local workers may behave badly, especially when they drink alcohol during the salary days and may disturb the peace of the residents. Accidents of sexually transmitted diseases like HIV may also

increases as movement of workforce increases. Hence, these features have to be considered before hand and camps should be managed properly.

Mitigation measures

- Avoid accommodating labor force in or directly adjacent to villages to avoid infiltration into local communities and associated increase in socially undesirable features such as prostitution, HIV/AIDS, and other sexually transmitted diseases, rape, adultery, drunkenness etc.
- Construction workers should be given health awareness training particularly the spread of HIV/AIDS and sexually transmitted diseases
- Recruit work force from the local community as much as possible, giving equal or more chance for women

7.2.19 Gender Impact

The construction of the road project has both negative and positive impacts on women. In terms of positive impacts, the construction of the road will encourage the local women to be beneficiaries of the social facilities like health, school, market etc. However, it will negatively affect women by exposing to STDs including HIV/AIDS pandemic. The large number of workforce coming to the road project might be exposed to or transmit different diseases.

Mitigation measure

The mitigation measures lay on the Woreda Administrations and Health department to pay due attentions, particularly to teach the locals to abstain from any undesirable contacts with the construction workforces and to make aware of HIV/AIDS mode of transmissions

7.2.20 Impact on Houses and Settlement Areas

Construction of the proposed road would affect some houses which are situated within the road right of way. These houses are being used for residential and for commercial purposes. According to the ERA standard specification, the proposed road is **DS5** standard which requires 50 m ROW. If we follow the standard strictly about **154** houses will be demolished. But if we reduce the ROW width to 30m or less the number of houses to be demolished will be **77** or less. The impact is more pronounced at Elwoya kebele of Yabelo woreda where most of the houses are constructed within the Row.

Table 7.5 Shows number of houses situated within 30m and 50 m ROW along the project road

Woreda	**30m ROW**	**50m ROW**
Konso	0	0
Teltele	16	25
Yabelo	61	129
Total	**77**	**154**

Mitigation measures

- Reduce the road right of way to 30 m or less
- Pay compensation for the affected houses based on replacement cost

- Shift the centerline of the road to the left side at Elwoya town and demolish those house situated on the left side. By doing so the number of houses to be affected would reduce from 113 to 41 at Elwoya town.
- Resettle the affected households

7.2.21 Impact on Archaeological, Cultural and Religious Resources

So far, there are no historically, archeologically and culturally important sites along the project road that could be impacted by the project road except Konso traditional terraces. However, there are few gravesites along the sides of the proposed road alignment, which require attention during the road design and construction. In addition, Religious, Cultural and Historic resources that were not identified during the field assessment may become apparent during excavation. Therefore, it is important that the Contractor should be aware of these situations.

Mitigation measures

- Provide brief training for equipment operators and construction personnel on discovery of artifacts and the need to report any discoveries to the relevant authority.
- Design road to avoid impacts on burial places
- If in case archeologically important phenomenon appear during road construction, suspend the work and report to the nearby authority or tourism bureau
- Whenever there is an indication of archaeological or historical events arrange for inspection by experts
- Concerning grave yard sites, care should be taken by the contractor not to damage the grave yards, If incase grave sites encountered by the construction work activities the contractor should report the case at stake to area property valuation committee for censuses of the property and payment compensation based on the proclamation No 455/2005 and regulation no 135/2007.

7.2.22 GENERAL PROTECTION MEASURES OF SENSITIVE SITES ALONG THE KONSO-YABELLO ROAD PROJECT

DURING SITE VISIT THE IDENTIFIED SENSITIVE LOCATIONS AND FACTORS THAT NEED PROPER MITIGATION ARE LISTED BELOW:

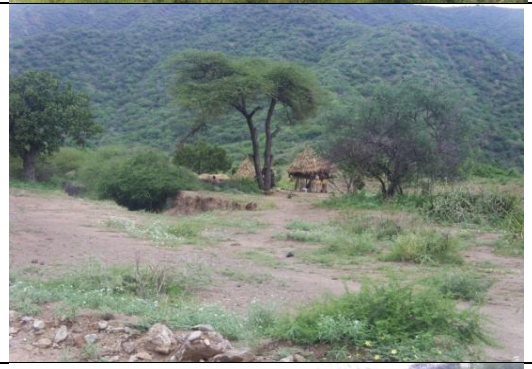
No	Chainage/ Location	Issue/Factor	Photo	Impact During Construction	Mitigation	Remark
1	0-4+00Km	Erosion affected area with protecting Engineering structures and Traditional Terraces		Erosion protection structure can be damaged	Replace the structures as needed and as soon as work is done (appropriate structure, size and function considered) for protecting road edge/embankment from erosion, reducing water energy and checking the formation of gullies	Take consideration of all factors that need protection and condition of existing structures before demolition
2						

				Construction material extraction can jeopardize the historical and functional value of the terraces	Protect all terraces from damage as NO GO areas although not listed as heritage in this context. They have values in protecting soil from erosion and stabilizing slopes	This area has been removed from world heritage site due to previous disturbances to the site
				Unstable embankment can be eroded and silt will be deposited further in stream bed	Stabilize slope by planting grass and trees	

3				Run off over road leads to erosion Energy dissipater damaged below	Provide proper cross drainage linked to side ditches that remove water from road surface	
4				Terraces and trees together are effective in protecting soil	Protect both trees and terraces from destruction	

5	12+000	Grazing area		Construction can perturb grazing land by earth work or vehicular traffic, application of camp and material sites will also damage the area	As much as possible	
6	AS No 5	As No 5		As No 5	As No 5	

7	17+000	Hill slope failure due to steepness		Earth work in such area will aggravate failure –Vegetation will also be removed	Avoid such areas	
8	18+000	Vegetation		Material extraction in such sites will affect vegetation and enhance erosion and sliding	Avoid such an area	
9	21+000	Bee hive		Cutting of trees without regard to their use can affect production such as honey	Check all trees for their use before cutting	

10	25+000	Abandoned Borrow site		Borrow sites left without reinstatement will lead to spoil deposition, siltation, aesthetic intrusion, become obstacles and if water is stagnating will be sites of mosquito breeding	Reinstate all borrow sites after use by leveling, top soil application and plantation	
11				idm	idm	

12	32+000	Occurrences of scattered wild animals including bird species have been seen		Vehicular movement during construction and operation will lead to accidents to wild life	During construction put signs to show for their occurrence, instruct drivers to be cautious and reduce speed During operation use traffic signs, if necessary speed checks	
13	34+000	Brindari Village		During construction dust, noise, accident and lack of access can affect settlement areas	Sprinkle water to reduce dust-taking care of availability in such water scarce areas, Work during day times to reduce noise, Advise drivers to conduct safe driving Access should be provided for pedestrians during construction	

	41+000	Livestock grazing area		Same as No5	Same as No 5	
14	59+000 and 76+00 and more up to Yabello	Water supply schemes: Access roads to Wells		Access roads to water supply areas can be damaged if used by construction traffic	Avoid driving over access roads to water supply sites, if otherwise maintain the roads regularly	
						

15	78+000	Eloya		Same as No 13	Same as No 13	
16				Construction can intrude belief sites and may prevent access	Avoid intrusion by creating buffer areas and allow access	
17	79+000	Utility line: Water supply		Water supply lines can be damaged or be within ROW	Beware of the locations and avoid working in the area. If in ROW discuss with concerned authorities to provide alternative supply before removal of the facility	

18		Abandoned old detour without rehabilitation		Detours abandoned without reinstatement have lost productivity and land will be permanently lost	Reinstate all detours to render them productive	
19		Degraded area erosion sensitive		This erosion susceptible site due to vegetation removal, nature of soil and goats.	During work in such areas minimize the activity, apply engineering and biological erosion control methods to prevent further erosion	

20	87+000	Pastoral camps and villages		Construction activity can disturb camps and settlements of pastoral communities	Designate such sites as No work-No Go zones	
				Same as above	Same as above	
						

						
21		Arbora Kebele		Same as No 13	Same as No 13	
22	95+000	Cut slope and road side vegetation		Widening will affect road side vegetation and enhance erosion	During construction use enhancement measures such as slope reduction, provision of proper drainage for protecting erosion on slopes Develop Forest or Park Management Plan to:	

					Minimize tree cutting and conduct re-plantation of trees; Stabilize slope by planting trees and grass; and, Manage any impacts on Yabelo State Park.	
23	101+000	Dry stream		Siltation and bank erosion are the process within the stream	Stabilize vulnerable channel banks by gabion structures, plant trees along the edge of the banks	
24	105+000	Church in Yabello		As No 16	As No 16	

8 RESETTLEMENT IMPACT

Development project like road construction either new or /and upgraded or rehabilitated results in land acquisition and involuntary resettlement. In this connection, ERA's Resettlement/Rehabilitation Policy Framework in its page 10 stated the preconditions for conducting Resettlement Action Plan (RAP). The main criteria or precondition is number of project affected individuals in one or more of the sub projects. It emphasized that when more than 200 persons are going to be affected by the project, it requires preparation of detail resettlement action plan. It also indicated that detail resettlement action plan should be prepared after appraisal and after detailed design of the road. This is because the final number of PAPs can be confirmed only after the determination of the alignment of the center line.

Concerning the Konso - Yabelo road project, SEIA revealed that the number of project affected people (PAPs) vary from Woreda to Woreda. Assuming that the centerline of the existing road maintained, number of PAPs who are expected to lose their houses in Konso and Teltele woredas are below 200, while number of PAPs in Yabelo Woreda is estimated to be more than 200. However by incorporating the appropriate mitigation measures in the design of the road, the impact would be reduced to the minimum. Some of the proposed mitigation measures to reduce adverse impact of the road construction on settlement areas, particularly at Elwoya town of Yabelo Woreda are reducing the right of way to 30 m or less and shifting the centerline of the road towards left side where few houses would be demolished as it compared to right side. But to take the appropriate mitigation, preparation of the RAP is a paramount importance which will be decided once the land acquisition study is completed.

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS

9.1 Environmental and social management plan

9.1.1 General

Socio-environmental management is concerned with implementation of the measures necessary to minimize or offset adverse socio-environmental impacts and to enhance beneficial impacts. Unless the mitigation and benefit enhancement measures identified in the SEIA are fully implemented, the prime function of ESIA, which is the safeguarding of the overall environment, would not be achieved.

Hence in order to maintain the environment effectively and efficiently, socio-environmental management must be fully integrated with the overall project management effort at all levels, which itself should be aimed at providing a high level of quality control, leading to a project which is properly designed, constructed and functions efficiently throughout its life.

Both project management and socio-environmental management responsibilities are normally shared among several government and non-government organizations, each with specific executive responsibilities for particular aspects, which are exercised during the various stages of project preparation, implementation and subsequent operation and maintenance. In the following section and in table 9.1.major socio-environmental management activities and responsible bodies for the execution of these activities are described.

9.1.2 Detailed Designing Phase

During the detailed design phase, the design consultant should incorporate all the recommended socio-environmental mitigation measures and enhancement measures which are recommended by the ESIA study to be included into the design, and including technical specifications in the bidding document for the prevention of adverse environmental effects.

9.1.3 Pre-Construction Phase

Prior to contractor mobilization and the commencement of construction, socio-environmental management should focus on:

- Ensuring that all government and funding agency requirements and procedures relating to ESIA are complied with,
- Ensuring that the tender and construction contract documents contain appropriate clauses to allow control of impacts arising from construction activities,
- Ensuring the proper implementation of land and property acquisition procedures including the payment of compensation.

9.1.4 Construction Phase

Most of the project socio-environmental management activities will be carried out during the construction phase, since it is at this time that most impacts can be expected to occur. The construction contractor will be fully responsible for implementing all the environmental mitigation measures included in the ESIA report, design and technical specifications. On the other hand, construction supervisor should monitor impacts and the proper implementation of mitigation measures at the right time. The supervision team shall be fully responsible for ensuring that all the works will be carried out as per specifications and drawings, that the

environmental impacts will be taken into consideration, and that good workmanship will be followed. The team should also be empowered to deal with infringements at the time and on the spot.

In order to discharge the responsibility of overseeing the EMP, the team of construction supervision consultant should contain an environmentalist/a sociologist. He/she will have executive responsibility for ensuring that all site socio-environmental management and monitoring aspects are dealt, promptly and properly. He/she will be responsible for establishing procedures and mechanisms for effective environmental management and monitoring and will ensure that these are fully incorporated and integrated with the overall construction supervision and monitoring framework. This aspect will cover matters such as the development of checklists of key points which will be monitored on a routine basis during construction and reporting mechanisms for ensuring that appropriate remedial action is taken.

The environmentalist/sociologist should also be responsible for reviewing and commenting on socio-environmental aspects of work plans prepared by the construction Contractor during the mobilization period, as well as in developing site environmental management procedures etc, in collaboration with the RE and other team members. He/she will also provide advice and assistance to the supervising Engineers and the RE, as and when required, on all aspects of socio-environmental management.

The socio-environmental supervisor of the construction supervision consultant should submit environmental performance progress reports to the EMSB of ERA, RE and to other relevant organizations as it deems.

On the other hand HIV/AIDS prevention, awareness creation, counseling, monitoring and evaluation activities should be subcontracted for NGOs, which are involved and experienced in such activities.

9.1.5 Commissioning Phase

During the commissioning phase, the construction contractor should clean up the project environment. All the salvages and waste materials from the construction process should be cleaned, demolished or dumped in appropriate and authorized places. Quarry sites, borrow areas, detour and access roads should be rehabilitated and replanted. Temporary camp sites should be removed and the compacted materials should be removed and reinstated so that the land continues giving services which were discontinued due to the project. The socio-environmental supervisor of the supervising consultant should follow up the proper implementation of these activities and check that the work as built meets all significant socio-environmental requirements before the project is officially accepted. The client should hold some amount of payment tagged to clean up until the construction supervision consultant assures that the work has been done properly.

9.1.6 Post-construction Phase

Continued enjoyment of the benefits arise from implementation of the project will only be achieved if effective routine and periodic maintenance of the road and drainage system is carried out in a timely manner. Environmental management and monitoring in this respect will be the responsibility of the Operations Department of ERA, with implementation being carried out either by the department itself or by hired contractors. The Environmental Management and Safety Branch within ERA is expected to take an overall advisory role during this phase.

9.1.7 Summary of Environmental management activities and responsibilities

Table 9.1.summarises the environmental management measures to be taken with regard to the control of the potential impacts which might occur during the pre-construction, construction and operational phases of the project; it also indicate who will be responsible for taking the necessary management actions.

Table 9-1 Major socio-environmental management activities, responsibilities and cost estimate

Phase of the project	Socio-environmental issues	Management activities/ Mitigation measures	Executing Body	Supervising Body	Cost estimate
Detail design phase	Inclusion of socio-environmental clauses in the contract document	• Ensure that detail design incorporate features to minimize adverse environmental impacts • Ensure that construction contract document contains appropriate clauses to allow control of environmental impacts that could arise from the project activities	Team leader of the final detailed design consultant,	ERA	Part of the design consultancy cost
	ESIA guidelines and policies	• Ensure that government & funding agency requirements relating to SEIA are complied with	Team leader of the design consultant	ERA	Part of the design consultancy cost
	Consideration of ESIA recommendation in the design	• Incorporate important ESIA mitigation measures such as minimizing road right of way, shifting road centerline in settlement areas, particularly at Elwoya town, incorporating erosion mitigation measures such as lining drain ways, grassing cut areas, designing retention walls at sensitive areas, etc.	Detailed design consultant	Team leader of the final detailed design consultant and ERA	Part of the design consultancy cost
Before the commencement	Compensation for the project affected people and properties	• Prepare a RAP and implement compensation and rehabilitation proposals properly Pay compensation for the affected structures	ERA through the Compensation implementation committee	Funding organization/Finance division of ERA	**7,208,000** assuming that the ROW will be limited to 30 m **16,236,000** assuming that the ROW will be 50m

Phase of the project	Socio-environmental issues	Management activities/ Mitigation measures	Executing Body	Supervising Body	Cost estimate
		• Pay compensation for the lost farm land or replace land to land	,,	,,	**2,963,840** assuming that the ROW will be 30 m.
					5,658,240 assuming that the row will be 50 m
		• Pay compensation for the lost fruit and commercial trees	,,	,,	**61,150** assuming that the ROW will be 30 m

Construction phase	Soil Erosion and drainage	▪ Providing adequate and appropriate drainage structures including:_ Concrete dissipation structures ▪ Diversion drains which avoid excessive concentration of flow; ▪ Lined drains for the sections with erosion-vulnerable soils and slopes, such as Elwoya-Yabelo section and from Km 6 to Km 15 ▪ Replanting (re-establishing vegetation cover) on cut-and-fill slopes and other exposed areas, ▪ Sow grass on exposed road sides ▪ Cuts on erodible surfaces should be properly executed during the dry season. ▪ All the culverts and drainage pipes should have sufficient opening to pass the design flood and to minimize scouring downstream. ▪ Adopt periodic road maintenance and clean drainage system before the onset of rainy season	Construction contractor	Environmentalist of the road construction supervision team	**240,000** Birr (salary for environmentalist for 12 months at the rate of 20,000 Birr per month). **120,000** Birr for regrassing of about 12 ha area to be exposed at the rate of 10,000 birr per ha

Construction phase	Slope Destabilization and Landscape Intrusion	• Avoid side casting of spoil materials from road cuts down-slope; • Distribute topsoil on road slopes and plant or sow appropriate plant or grass species. ▪ Removal of vegetation only within the borderline of construction to secure the stability of the adjoining slope to its maximum. ▪ Protecting vulnerable slopes, particularly those located between km 14 - 16 and km 80 - 90 by retaining walls, gabions etc; the foundation has to be drained properly to guarantee dry and stable condition for the structures. ▪ Carefully remove the top soils fro borrow and quarry areas and deposit at appropriate sites for re-use during reinstating of borrow and quarry areas ▪ Distribution of topsoil on road slopes and planting or sowing with appropriate plant species.	Construction contractor	RE/Environmentalist of the road construction supervision team	Part of construction and supervision cost

Construction phase	Quarry sites, Borrow areas and Detour Roads	• Select quarry and borrow sites far from settlement and environmentally sensitive areas and get approval from supervising Engineer and local authorities before exploiting • Do not locate quarry and borrow sites in a forest areas and at river bed and other water supply sources • Preserve top soils for reuse to refill borrow sites and quarry areas • Rehabilitate all quarries and borrow sites and access roads after the completion of the road construction works and plant appropriate tree species • After reinstating, plant appropriate tree species (indigenous trees) or grasses to recover the original vegetation and to improve the biodiversity and aesthetic value of these sites • Provide proper drainage to avoid storage of water in quarry and borrow sites to reduce malarial out break through reduction of mosquito breeding sites	Construction Contractor	RE/Environmentalist of the road construction supervision team	Part of the construction cost

Construction phase	Air Pollution	• Restrict traffic speeds to minimize dust production and its adverse effects, • Vehicles and machinery must be kept in good condition to prevent excessive smoke from exhausts, ▪ Reduce dust by watering the road surface that travels through settlement areas, particularly at Konso town, Brindar village, Elwoya and at Yabelo town and at construction camp. Spray water at least three times a day, • Locate construction plants such as stone crushing plants away from the settlement areas, • Prevent the generation of air pollutants during the construction period by watering during crushing and screening of aggregates, • Avoid burning of materials such as tiers, plastic, rubber products or other materials that creates heavy smock or nuisance odor, and • Avoiding disposing of any volatile chemicals to the air.	Construction Contractor	Environmentalist /sociologist of the road construction supervision team in collaboration RE and local authorities	Part of the construction & supervision cost

Construction phase	Noise Nuisance	• Minimize construction works producing nuisance noise or rescheduled so as not to occur at night or on locally recognized holidays or religious days. • Keep all machinery and plant to the applicable noise standards, and equip them with effective noise mufflers. • Locate noisy plants such as rock crusher far from the settlement and noise sensitive areas • Minimize the use of explosives and promote a systematic blasting schedule	Construction Contractor	Environmentalist /sociologist of the road construction supervision team in collaboration RE and local authorities	Part of the construction & supervision cost
Construction phase	Traffic Accident	▪ Provide alternative pedestrian routes where these are interrupted ▪ Provide diversions with suitable and reflecting road signs; provide barricades and delineators and flagmen to guide the construction traffic. For regulation of traffic, the flagmen shall be equipped with red and green flags ▪ Use clear, labeled properly and meaning full traffic signs and speed limits, especially at road crossing of the people and conjunction of animals ▪ Provide traffic awareness specially at schools, churches and other risky places, ▪ Delineating or put appropriate signs on livestock crossing areas	Construction Contractor	RE in collaboration with Woreda traffic police	Part of the construction & supervision cost

Construction phase	Stone Blasting and Vibration	• Stone crushing plants, quarry sites and other activities that produce high level of vibration and sound should not be located near residential areas. • Appropriate safety measures should be taken during blasting operations. • Safety protection materials such as goggle, helmets and masks should be distributed for the workers who involve in blasting, crashing and other related activities • Inform nearby residents about the blasting schedules and make them aware of high sound and related vibration • If vibration causes damage on buildings or other infrastructures, pay appropriate/replacement compensation for the affected structures.	Construction Contractor	Environmentalist /sociologist of the road construction supervision team in collaboration RE and local authorities	Part of the construction & supervision cost

Construction phase	Vegetation Damage and Loss of Flora	• Designing the road upgrading project so as to follow the existing road alignments as much as possible and avoid directing road alignment and detour roads wherever there is significant amount of natural vegetation, • Reduce road right of way to the minimum • Confine vegetation clearance to what is absolutely necessary; • Establish a nursery at Each Woreda along the project road to propagate and plant indigenous trees in areas adjacent to the roads and at areas affected due to operation of quarries and borrow pits • Design the road upgrading project so as to follow the existing road alignments • Providing a training and awareness raising programme for people involving in constructing the road, • Transplant trees which are transplantable • Plant at least 10 seedlings for each and every affected mature trees and water them • Aware construction work force, not to cut tree for any purpose without prior approval of Environmental supervisor and local forestry department. A forest or park management plan should be prepared to manage impacts in the Yabelo State Forest. •	Construction Contractor in collaboration with each Woreda forestry units	Environmentalist /sociologist of the road construction supervision team	**150,000** (for the establishment of nursery to propagate indigenous trees)

Construction phase	Loss of Fauna and Wildlife Habitats	▪ Control encroachment into areas of wildlife habitats ▪ Apply speed limits and measures to increase the awareness of drivers towards wildlife, ▪ Installing warning signs and posters on the animal crossing routes, particularly Between Segen river and Brindar, and between Brindar and Elwoya ▪ Restoring affected areas through replanting of vegetation, ▪ Increasing awareness towards habitat and wildlife conservation, ▪ Forbidding the construction workforces from cutting down trees and hunting wild animals.	Construction contractor	Environmentalist /sociologist of the road construction supervision team	**150,000** (for installing warning signs and posters on the animal crossing routes)

Construction phase	Construction Camps	• Careful locate the camps in such a way to avoid sensitive areas such as dense forests and wildlife habitats, critical slopes, community water supply points, etc. • Take care when selecting campsites in such a way that it should not invite close interaction with local community. • Take photograph of the campsite before the construction of any structure in order to compare the level of environmental degradation before and after the establishment of the camp site and to plan rehabilitation work • Tree removal from any site shall only be done with the prior knowledge of environmental supervisor team and local forestry Department, • Establish construction campsite with appropriate and standard sanitation facilities including an imperviously lined septic tanks to reduce possible pollution impact on ground and surface water resources • All waste must be treated in a proper way and disposed properly in a priory designated place under the control of construction supervisor and Woreda health offices. • The camps should be dismantled and the areas rehabilitated as per the surrounding nature once construction is completed.	Construction contractor in consultation with ERA's camp managers and Woreda administration and local communities	Environmentalist /sociologist of the road construction supervision team in collaboration with the Woreda Environmental protection, land administration and utilization unit (EPLAUU), and Health office	Part of the construction & supervision cost

		• Provision of health care services, potable water supply, garbage disposal and sanitation facilities for the camps; • Housing at the camps should be of sufficient quality to prevent disease-causing vectors, and adequate in number to prevent overcrowding. Furthermore, the campsites must have proper management and discipline • Maintain proper management and discipline in the camps;			
Construction phase	Loss and/or Disturbance of Farm and grazing land	• Minimize land take by locating camp sites, quarry areas, borrow sites, etc., in none productive areas • Minimize road right of way to 30 m or less • Stockpile top soils from borrow areas, quarry sites, access roads to use during rehabilitation work • Rehabilitate all the temporarily lost land after the completion of road construction in such a way that it continues giving the interrupted services • Pay compensation either in form of land or money for the lost land and production	Construction Contractor	Environmentalist /sociologist of the road construction supervision team in collaboration with RE and local authorities	Part of the construction & supervision cost

Construction phase	Malaria outbreak	• Do not induce malaria out break by creating temporary & permanent water holding areas which favor mosquito breeding • Use chemically treated mosquito nets in times of malaria out break and provide a clinic or medical facilities at the construction camp • Restore borrow pits and quarry areas to minimize breeding sites for mosquito,	Construction Contractor	Environmentalist /sociologist of the supervision team in collaboration with the Woreda health office	**150,000** Birr for purchasing and distributing chemically coated mosquito nets for about 2000 people who are residing within 0.5 km radius of the road at a rate of 75 birr per mosquito net
Construction phase	HIV/AIDS prevention	• Provide health education mainly focusing on the HIV transmission and prevention • Avoid discrimination in work places due to HIV/AIDS and provide counseling service • Provide free counseling and distribute condoms & leaflets to workforce and vulnerable group of nearby communities	NGOs involved in such activities in collaboration with the Woreda health offices	Environmentalist /sociologist of the supervision team in collaboration with health centers along the project road	**1,000,000** Birr (for subcontracting the activities)

Construction phase	Occupational health and Safety	• Store any explosives and chemicals in a safe place and make notification during blasting activities • Distribute goggles, helmets and other masks for the workers who directly involved in explosives, stone crashing and other similar activities, • Minimize dust emission by watering the road during construction • Provide first-aid and clinics in the work places and main construction camps • Put visible and appropriate warning signs on the road during road construction including speed limits • Provide education to personnel of the contractor about safety procedures and emergency response plans associated with their task	Construction contractor	Environmentalist /sociologist of the supervision team in collaboration with Woreda administration	Part of the construction & supervision cost
Construction phase	Other Health Threat	• Minimize dust emission by watering the road during construction • Provide safe water supply & appropriate waste disposal facilities including the provision of sanitary latrines in the construction camp • Provide clean, un congested and ventilated rooms for the workforce • Provide a clinic or medical facilities at the temporary and permanent camps	Construction Contractor	Environmentalist /sociologist of the supervision team in collaboration with the Woreda health office	Part of the construction & supervision cost

Construction phase	Aesthetic Value	• Re-plant vegetation to restore the natural appearance of the affected areas where feasible; • Re-plant the reinstated borrow sites with appropriate plant species, mainly trees and shrubs.	Construction contractor	Environmentalist /sociologist of the supervision team in collaboration with each Woreda forestry and EPLAUU	Part of the construction and supervision cost
Construction phase	Impact from Immigrant Workers	• Avoid accommodating labor force in or directly adjacent to villages to avoid infiltration into local communities and associated increase in socially undesirable features such as prostitution, HIV/AIDS, and other sexually transmitted diseases, rape, adultery, drunkenness etc. • Recruit work force from the local community as much as possible, giving equal or more chance for women	Construction Contractor	Environmentalist /sociologist of the supervision team in collaboration with the Woreda health office and Woreda administration	Part of the construction & supervision cost
Construction phase	**Unforeseen impacts**	• Identify unforeseen socio-environmental impacts of the project and propose remedial measures • Advise construction contractor regarding unforeseen environmental issues of the project	Environmentalist /sociologist of the supervision team	Environmentalist/sociologist of the road construction supervision team in collaboration with Woreda EPLAUU and EMSB of ERA	Part of the supervision cost

Commissioning phase		• Clean all the salvages and waste materials from the construction process and damp in an appropriate and authorized places. • Rehabilitate Quarry and borrow areas and drain if any water is impounded. • Remove all the temporary camps and loosen the compacted materials and reinstated so that the land continues giving services which were discontinued due to the project. • Check that the work as built meets all significant environmental requirements before the project is officially accepted.	Construction contractor	RE/Environmentalist/ sociologist of the road construction supervision team in collaboration with Woreda EPLAUU and EMSB of ERA	Part of the construction & supervision cost
Operation phase		• Conduct periodic monitoring of the road condition and drainage system • Conduct timely maintenance of the road • Monitor and maintain road side erosion and erosion at the downstream of the drainage culverts	Operations Department of ERA in collaboration with concerning local communities and offices of the Woredas along the project road	The Environmental Management and Safety Branch of ERA in collaboration with Woreda EPLAUU	Part of the road operation and maintenance cost
Subtotal Socio-environmental mitigation, compensation and management cost					**12,042,990 assuming 30m ROW**

As it can be seen from the above table, the total cost of environmental mitigation, management and compensation cost estimate assuming 50m Row is very high as compared to 30m ROW. Therefore, we recommend 30 m ROW or less to minimize the socio-environmental impact mitigation and compensation cost of the project.

9.2 Environmental Monitoring Plan

General

Socio-environmental monitoring and evaluation of the Konso - Yabelo road project is very essential part of the EMP. It helps to follow up the implementation of the proposed mitigation measures and evaluate effectiveness of the proposed mitigation measures.

There are two basic forms of Socio-environmental monitoring. Compliance monitoring, which checks whether prescribed actions have been carried out or not, usually by means of inspection or enquiries; and effect monitoring, which records the consequences of activities on one or more environmental components and usually involves physical measurement of selected parameters or the execution of surveys to establish the nature and extent of induced changes. For this particular case, it is recommended to carry out compliance monitoring in order to crosscheck whether the proposed mitigation and enhancement measures are taken properly. Effect monitoring is beyond the scope of this study and it could be done by researchers, EPA, ERA or other interested parties.

Compliance monitoring can be carried out internally by the project proponent itself or externally by other responsible organization or stakeholders other than the project proponent.

For this particular case, external monitoring is recommended to be carried out by a team comprises of **5** experts organized from Regional EPA, Woreda administration, Woreda EPLAUU, Woreda forestry and Woreda health center. The team could also include other professionals from Woreda offices whenever the monitoring activities required such professionals or consult appropriate experts at regional and zonal levels. The team is proposed to be lead by a representative from the Regional EPA office. The team will report its findings and recommendation to the regional EPA. The regional EPA then will take immediate actions accordingly, and communicate with ERA and construction supervision consultants. Such type of monitoring could also be carried out by the funding agency provided that carrying socio-environmental monitoring is part of the agencies funding policy. The detailed socio-environmental monitoring plan for external monitoring is given in **Table 9.2,** while the Implementation of the socio-environmental management plan specified in **Table 9.1** will be overseen by the socio-environmental team of the supervising consultants.

The establishment and coordination of the external monitoring team will be the responsibility of the regional EPA. For this particular case the SNNPR and the Oromia EPAs are the responsible organizations.

In this regard, the responsibility of ERA should be assigning of adequate budget for the socio-environmental monitoring purpose and inviting the concerned regional EPA offices during the evaluation of draft ESIA report so that they will be aware of the project and provide their comment and suggestion on the management and monitoring plan. ERA should also submit the copy of the final report and project construction schedule to the Regional EPAs in time so that they will prepare themselves to handle the external socio-environmental monitoring activities.

Federal EPA could also involve in complaint monitoring and auditing. Whenever complaint on socio-environmental management performance raised by any stakeholder or responsible person, Environmental impact assessment section of FEPA should undertake complaint monitoring and take remedial action wherever it is appropriate.

Table 9.2: Environmental Monitoring Plan

Phases of the Project	Socio-environmental issues	Indicators/Parameters to be Monitored	Location/ Project Component	Frequency	Responsibility	Cost Estimate in Birr
Pre-construction phase	Inclusion of environmental mitigation measures in the contract document	Check whether the mitigation and enhancement measures are properly included in the contract document	At ERA head office	Once during the document evaluation	ERA and EPA's representative	Part of the routine work
	Displacement of people and loss of properties	Compliant from the affected people The number of compensation payments mode and the number of pending payments. The number of PAPS Relocated to their new houses/structures, and the number that still have to be relocated. The number of vulnerable people provided with assistance, the kind of assistance sought and how it was given. The RIC will need to present monthly repots to the woreda administration	In major settlement areas along the project road	Twice, before the start of the construction work and at the middle of the construction phase for 7 days at each round	**The proposed monitoring team.**	35,700 (daily allowance for the monitoring team, for 14 days including car rent and fuel cost)

Phases of the Project	Socio-environmental issues	Indicators/Parameters to be Monitored	Location/ Project Component	Frequency	Responsibility	Cost Estimate in Birr
		and concerned office of ERC.				
Construction phase	Pollution of water quality by construction activities and improper disposal of wastes from campsites and construction areas	Water quality parameters such as EC, pH, TDS, Turbidity, oil, grease, petrol and diesel leakages	Major rivers, spring and borehole water samples from construction camp sites	Three times (Before the start of construction, during the construction and after the completion of construction for **5** days at each round)	**The proposed monitoring team**	42,750 (for analyzing 3 water samples three times each at the rate of 500 birr per sample; and per diem for four experts including fuel and car rent for 21 days).
	Land use loss due to land requirement for road construction, access road, quarry and borrow sites and camp sites, etc,	Area of affected land use in ha	Along the project road, access roads, camp sites, quarry sites	Once per year for **7** days at each year	**The proposed monitoring team**	53,550(daily allowance for the team for 21 days including car rent and fuel cost
	Soil erosion	Area exposed for erosion	Cut and fill areas and steep slopes	Once per year	**The proposed monitoring team**	Could be done at the same time with the above activities

Phases of the Project	Socio-environmental issues	Indicators/Parameters to be Monitored	Location/ Project Component	Frequency	Responsibility	Cost Estimate in Birr
	Loss of Roadside plantations and indigenous trees	▪ Number of indigenous trees fallen, ▪ Number of nursery established and number of tree seedlings planted	At each Woreda along the project road	Once per year	**the proposed monitoring team**	Could be done at the same time with the above activities without additional cost
	Disposal of construction spoils	Number of unauthorized Spoil disposal sites	Spoil disposed sites along the project road	Once per year	**The proposed monitoring team**	Could be done at the same time with the above activities without additional cost
	Health condition of the people along the project road and status of HIV/AIDS	Overall health and sanitation situation of the project area Reports of disease incidence/ prevalence from health center	Construction campsites, working areas and nearby towns	Once per year for **7** days at each round	**The proposed monitoring team**	53,550 (daily allowance for the team for 21 days including car rent and fuel cost
	Spread of malaria	Prevalence and trend of malaria	Construction campsites and working areas	Once per year during the pick season	**The proposed monitoring team**	Could be done at the same time with the above activities without additional cost

Phases of the Project	Major Adverse Impacts	Indicators/Parameters to be Measured/ Monitored	Location/ Project Component	Frequency	Responsibility	Cost Estimate
Construction completion phase	Aesthetic value and landscape	Un-rehabilitated areas and leftovers	Throughout the project area	Once for **10** days before officially terminating of construction contract	**The proposed monitoring team**	25,500(daily allowance for the team for 10 days including car rent and fuel cost
Operation phase	Sedimentation of drainage structures, loss of traffic signage, Visibility problems and roadside weeds	Number of blocked drainage structures and section of road with potholes, etc.	Along the project road	Once per year	Operation and maintenance department of ERA	Part of routine work
Total estimated socio-environmental monitoring cost						**USD 211,050**

* Daily allowance per person=250 birr/day
* Car Rent per day = 1000 birr
Fuel cost = 300 birr/ day
Assuming that construction will take 3 years

9.3 Capacity Building

Capacity building is essential to properly implement the proposed socio-environmental management and monitoring plan. The Environmental protection, land administration and utilization unit of Konso and Yabelo woreda are the principal stakeholders for managing and implementing the environmental issues within the project area. Therefore, it is pertinent to increase the capacity of these units by providing necessary training for the staff members and by equipping the units with facilities and necessary tools. The recommended level of training in relation to the proposed road construction is on job training. The potential participants in addition to the Konso and Yabelo Woreda EPLAU units could be representatives from the construction contractor workforce and key professionals of the construction supervising consultants.

On job training can be arranged by the construction supervision consultant in collaboration with EMSB of ERA for five days before the start of actual road construction work and for another five days after the midway of construction work. The content of training should focus on environmental conservation and awareness creation in general and HIV/AIDS prevention in particular.

The first session of on job training could incorporate the following modules:

- An introduction to the concepts, terminology, aims and objectives of EIA, socio-environmental management and monitoring, with specific reference to road development projects
- HIV/AIDS pervasion and awareness creation
- On-site review of existing socio-environmental conditions in the project area, potential impacts and mitigation and benefit enhancement measures
- A review of approaches which have been and are being adopted towards socio-environmental management in the case of the present project, and their applicability in general to road projects, with particular reference to how uncertainties are handled
- A review of the role of socio-environmental monitoring as a management tool.

The second session could cover the following aspects:

- on-site comparison of impact predictions in the EIA with what has happened in practice, with particular emphasis on analyzing the reasons for any significant differences
- on-site review and analysis of the success or otherwise of the proposed mitigation measures, socio-environmental management and monitoring approaches, including contributions from the contractor, the site supervision team, and representatives of the local authorities and the people who live along the road
- Summary of lessons to be learned which could usefully be applied to similar, future projects.

A generally informal approach would be adapted to the training sessions, in order to promote interaction between trainees and trainers, and in particular to facilitate the free and open exchange and discussion of ideas.

Numbers of trainees would have to be discussed and agreed with both ERA and construction supervision consultant, but, it is suggested that the number should be limited to about 15. The cost estimated for the proposed on job training (capacity building) is listed in Table9.3.

Table 9.3 Cost Estimate for Capacity Building

No.	Item	Quantity	Unit rate	Number of days	Amount in Birr
1	Fee for environmental specialist	1	2000	10	20,000
2	Vehicle hire	2	1000	10	20,000
3	Per diem for trainees	15	250	10	37,500
4	Course materials	Lump sum			5,000
	Sub total				**82,500**

9.5. Implementation schedule socio-Environmental management plan

Implementation schedule for proposed konso-yabelo upgrading road project socio-Environmental management plan during preconstruction, construction and commissioning phase against component of activities are designed and presented in the table 4.4 here below.

The dot line in the table 9.4 indicates contuse activities while solid line indicates at frequently

Table 9.4 Implementation Schedule for Konso - Yabelo road project Socio-Environmental Management Plan

Socio-Environmental Management and Monitoring Activities	**Phases of the project**				
	Pre-Construction Phase	**Construction phase**			**Commissioning Phase**
		1st year	2nd year	3rd year	
Ensure that detail design incorporate features to minimize adverse socio-environmental impacts					
Ensure that construction contract document contains appropriate clauses regarding SEIA					
Pay Compensation for the affected properties					
Environmental awareness creation and capacity building training					
Air Pollution and Dust Management and Monitoring					
• Health and risk management					
Traffic Management & Monitoring					
Awareness creation and prevention of HIV/AIDS					
Construction Spoil					

Socio-Environmental Management and Monitoring Activities	**Phases of the project**				
	Pre-Construction Phase	**Construction phase**			**Commissioning Phase**
		1st year	2nd year	3rd year	
and Waste Management and Monitoring					
Soil erosion and drainage management					
Borrow & quarry areas rehabilitation and management					
Restoration and clearance of temporary camp sites					
Seedling, Plantation and Re-vegetation Management & Monitoring					
Water Quality Management & Monitoring	……	……	…….	…….	……
Clearance of drainage system, ditches and removal of weeds from the road shoulder to increase visibility					

All the proposed socio-environmental management and monitoring plans in this report are proposed to be implemented during pre-construction and construction period. It is recommended that at the end of the construction period, EMSB of ERA in collaboration with Konso and Yabelo woreda EPLAUU could propose socio-environmental management and monitoring plan for the project operation periods as it deems necessary. The plan may include measures to mitigate unseen impacts and enhance benefits from the implementation of the present socio-environmental management plan of the project.

9.4 Environmental Mitigation, Management and Monitoring Cost Estimate

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- Items of an engineering nature that are in any case required under the construction contract and do not involve additional costs have been excluded from this cost estimate. Examples are drainage structures, retaining walls and lined drains that are designed to control or prevent soil erosion and slope instability.
- The costs of mitigation measures to be implemented by the Contractor during construction are considered as included in his obligations under the construction contract. This applies to such measures as good management of the construction equipment and vehicles, workforce/camp management, good construction works, provision of necessary facilities for the workforce and proper waste management or disposal, restoration of campsites, borrow pits and quarries, traffic safety, etc.
- Some of the mitigation measures to be implemented by the local government organizations are considered as part of their routine jobs. For example, law enforcement, controlling illegal establishment of settlements and exploitation of natural resources educating people about health and traffic safety, etc.

Table 9.5 Environmental Mitigation, compensation and Monitoring Costs for Konso - Yabelo Road

No.	Item	Reference	Amount in Birr assuming 30m ROW	Amount in Birr assuming 50m ROW
1	Socio-Environmental mitigation, compensation and management Cost	Table 9.1	**12,042,990**	**23,810,240**
2	Socio-Environmental Monitoring Cost	Table 9.2	**211,050**	**211,050**
3	Training Cost	Table 9.3	**82,500**	**82,500**
	Total		12,336,540	24,103,790
	10 % for Contingency		1,233,654	2,410,379
	Grand Total		**13,570,194**	**26,514,169**

10 KEY ISSUES TO BE INCLUDED IN THE CONTRACT DOCUMENT

Concerning socio-environmental aspects of the road, the tender document for the Konso - Yabelo road construction contract should include the following but not limited to:

10.1 Preparation of Socio-Environmental Management Plan

Contractor shall update the existing EMP from the EIA report or prepare a new EMP that suits construction works for the entire project road. The EMP shall be updated/prepared using or based on the ERA's EMSB guideline and submitted to RE/environmental supervisor and ERA / EMSB for reviewing and approval before the construction work commences.

10.2 Potential Impacts from Preparation and Location of Campsites

Location of campsites will have an adverse effect on the environment. The following activities should be specified in the contract document to minimize adverse impacts that could be associated with the location of camp sites:

- The Contractor Shall select location of campsites in collaboration with local authorities, RE and with EMSB of ERA, and camps shall only be established at places/locations approved by ERA's EMSB and the RE in collaboration with local Officials and community members
- Locate campsites in less productive areas away from streams and rivers (at least 500m)
- The camp sites shall not be located close to residential areas, on fertile farmlands, and forested lands
- The RE and the contractors shall take photograph of the campsite before the construction of any structure in order to compare the level of environmental degradation before and after the establishment of the camp site and to plan rehabilitation work. Any removal activities of trees for camping shall be done in the presence of environmentalist from the supervision Team and a Forester from Local Forestry Department
- Establish construction campsite with appropriate and standard sanitation facilities including imperviously lined septic tanks to reduce possible pollution impact on ground and surface water resources
- Dispose all the wastes from the camp properly in a designated and authorized places
- The Contractor shall take all necessary measures and precautions to avoid any nuisance or disturbance to inhabitants arising from the execution of works
- If the campsites are not going to be used or going to be demolished, the contractor shall reinstate (the reinstatement activities shall include stockpiling the topsoil during camp construction, removing all concretes/slabs and all scrap metals from the workshops, loosening the compacted soils, and spreading of the top soils) to its original state.
- The RE shall order the Camp administrator for the planting of tree seedlings in the camp yard for beautification purpose.

10.3 Air Pollution

The major effects on air quality during the construction period will be an increase in suspended particles from blasting, excavation, and movement of heavy machinery and other vehicles over unpaved or dusty roads. Therefore, to minimize air pollution the Contractor shall implement the following mitigation measures:

- The Contractor shall reduce dust from construction sites, access roads and detours by watering at least three times a day when the same are located in sensitive areas, towns and villages
- The Contractor shall prevent generation of air pollutants by watering during crushing and screening of aggregates
- The Contractor shall locate construction plants such as stone crushing plants away from the settlement areas, health centers, hospitals and schools.
- The Contractor shall avoid burning of materials such as tiers, plastic, rubber products or other materials that creates heavy smoke or nuisance odor.
- The Contractor shall avoid disposing of any volatile chemicals to the air
- Any vehicle with an open load carrying area used for transporting potentially dust producing materials should have properly fitted side and tail boards. Materials having the potential to produce dust should not be loaded to a level higher than the side and tail boards and should be covered with a clean tarpaulin in good condition
- The contractor shall provide safety equipment such as goggle, masks and other protection measures for his work force as it needed
- The RE shall supervise and monitor the contractor's compliance with the above conditions

10.4 Noise Pollution

Excessive noise levels will arise during construction from operating construction equipment and vehicles, blasting, concrete batching, and aggregate production.

There are some sensitive noise receptors including public clinics, schools and religious places near the construction activity areas. Consequently, noise generated from the site can be a major annoyance to a large number of people, especially in Konso and Yabelo towns. Therefore, the Contractor shall implement the following mitigation measures to minimize possible noise impacts:

- The Contractor shall not operate noisy operations like crushing plants near the noise sensitive and settlement areas, hospitals, schools, potential wildlife areas.
- Construction activities that generate disturbing noise levels are to take place during conventional working hours wherever possible
- The Contractor shall screen equipments producing high levels of noise when working near the settlement areas, clinics and religious areas
- The Contractor shall minimize the use of explosives and promote a systematic blasting schedule
- The Contractor shall provide safety equipments pertaining to noise, such as ear protection wear whenever necessary for the workers

- The RE shall supervise and monitor the contractor's compliance of the contractors with the above conditions.

10.5 Impact from Quarry Sites, Borrow Areas and Detour Roads

Quarry sites, borrow areas and detour roads unless properly rehabilitated would cause socio-environmental problems like loss of productive land, loss of vegetation, soil erosion, creation of mosquito breeding site, un-aesthetic view, etc. Therefore, the contractor should implement the following mitigation measures:

- The contractor shall select quarry and borrow sites away from settlement and environmentally sensitive areas after the approval by RE, ERA (EMSB) and Local Authorities
- The Contractor shall not select quarry and borrow sites near and at river bed
- The Contractor shall not establish quarries and borrow pits in forest areas
- Maintain detour roads within the ROW as much as possible
- The Contractor shall reinstate all quarries and borrow sites and access roads after the completion of the road construction works, any material sites shall not be left open unless otherwise approved by ERA (EMSB) and RE upon request from local people to have the sites open permanently. The reinstatement works shall include the following activities:
- The Contractor shall take photographs of the proposed borrow areas, quarry sites and detour roads before the commencement of the works
- The Contractor shall take lists of all the tree species found in the proposed quarry sites, borrow areas and detour roads and the exact number of trees to be affected in the presence of Environmentalist from the Supervision Team and a Forester from the Woreda Forestry unit
- The Contractor shall preserve top soils for later use to refill borrow sites and quarry areas and do not mix top soil with subsoil
- Borrows and quarries shall be reinstated (which include dumping unnecessary materials and excess cuts, landscaping/leveling/shaping, spreading the topsoil uniformly over the surface, constructing spillways if in case the sites are deep enough to hold water and putting a barrier all around the sites to prevent accidents on animals and human beings) after completion of the works
- After reinstating, plant appropriate tree species (indigenous trees) or grasses to recover the original vegetation and to improve the ecological and aesthetic value of these sites
- Provide proper drainage to avoid storage of water in quarry and borrow sites to reduce malarial out break through reduction of mosquito breeding sites
- Access roads to these sites shall be reinstated to productive state. Reinstatement work shall include: preservation of the top soils and stockpiling the top soils, removing the applied selected/foreign materials, loosening the compacted soils and spreading the top soils

10.6 Slope Instability and Soil Erosion

Road construction work which involves cutting and filling in steep slopes will most likely induce slope instability and soil erosion problems. In the mountainous sections, construction of the road would require cut and fill, and in some places the cut or fill slopes may not intersect with the existing grade within a reasonable distance. The stretches where some slope stability problems likely to occur are from km 1.5 to km 14.These areas, due to steep slope, will be vulnerable to slope instability and soil erosion. Therefore, the contractor should adopt the following mitigation measures among others:

- The contractor shall protect unstable slopes with stabilizing structures such as retaining walls; wire basketry, gabions etc. as permanent installation on risk slopes
- The contractor shall implement Bioengineering techniques to protect and stabilize unstable slopes and also shall use appropriate local variety grass species together with a physical engineering measures as soon as possible after completion of the works.
- Install cut-off drains above cut slopes
- The contractor shall provide riprap, grassing on erosion prone slopes of high embankments and fill areas, toes and banks of the streams to avoid/restrict erosion
- The contractor shall remove all dangerous and loose boulders and rocks from cut faces
- Limit disturbance to natural vegetation above cut slopes
- The contractor shall pave roadside drains above 5% slope gradients and construct all energy- dissipating structures at the drainage outlets and discharging points
- The contractor shall provide cross drainage structures as close as possible to reduce the amount of flow from side ditches and to let the flood join to the nearest stream easily without scouring the side walls
- The contractor shall plant local variety grass species and replant slope embankments and erosion prone areas and water them until the grasses and trees are survive independently
- The contractor shall construct different physical erosion control measures such as paved side drain, check dams, and other energy dissipating structures such as chutes, cascades, etc.

10.7 Impact on Soil and Water Resources

The road construction process will cause some adverse effects on soil and water resources. Though there is no water in almost all the streams during the dry season, water will be available during the wet season. The likely sources of road construction impacts on the soil and water resources will include, redirecting water courses at culverts and bridges, enhanced soil erosion from road cuts and other exposed sites, temporary road diversion, operation of quarries and borrow pits, effluent discharge from campsites, spills of chemicals and pollutants from used fuel and oil, discharge of cement slag during construction, can all pose pollution risk to soils and streams intercepted by the road. Therefore, the Contractor shall implement the following mitigation measures to minimize these and other impacts of road construction on soils and water resources:

- The Contractor shall avoid dumping of solid and liquid wastes from the construction areas and camps into farm lands, streams, rivers and dry stream beds
- The Contractor shall not block natural flow of streams, rivers and wetlands
- The Contractor shall not select quarry sites in river beds and river banks
- The Contractor shall Re-grass cut slopes and fill sections to avoid downstream sedimentation and water quality deterioration
- The Contractor shall avoid polluting of soils, rivers or streams during concreting work from cement slag
- The Contractor shall not clean/wash construction equipment in to wet lands, streams and rivers, and shall not discharge waste chemicals into streams, if in case this problem happens, the contractor, at his own expense, shall be obliged to clear water until it reaches its original quality level or potable standard
- Servicing of plants, equipments and vehicles shall be carried out at a workshop area. The workshop area should be equipped with secured storage areas for fuels, oils and other fluids. The storages should be constructed in such a way as to contain any spillages, which may occur. Similar storage should be constructed to store used fluids prior to their disposal in a designated and authorized place. Waste oils from various plants and equipments shall be collected in drums and send it to oil reprocessing companies and never dispose them into wetlands, streams and rivers
- The contractor shall avoid conflicting with water demands for domestic and livestock consumption & give priority for domestic and livestock consumption, and not use water from low discharge springs or streams in this case the contractor shall fulfill his water requirements for campsites and construction purposes by developing own water sources
- The Contractor shall avoid locating camp sites near the water sources and ground water recharging areas
- Careful handling of explosives and residue of fuel to avoid health risk and soil and water pollution
- The contractor shall ensure that all the existing stream courses and drains within and adjacent to the site are kept safe and free from any debris
- The contractor shall officially handover all developed water sources at any locations to the Local water Department after the completion of the road construction work

10.8 Impact on Flora

The road construction activities will cause some damages to already endangered tree species and vegetation found in the road right-of-way, campsites, quarry areas, borrow sites and access and detour roads. To minimize possible adverse impacts on vegetation, the contractor shall take the following measures:

- The contractor should not locate quarry or borrow sites wherever there are endangered tree species
- The Contractor shall confine clearing of vegetation to what is absolutely necessary. All trees and shrubs which are not required to be cleared or removed for construction

purposes should be protected from any damage that may be caused by the contractor's construction operations and equipment

- The Contractor shall not locate campsites, quarries and borrow pits and detour roads in a natural forest areas
- Farmers shall be given adequate time to harvest their trees before clearing
- Transplant trees which are transplantable
- The Contractor shall take maximum care and never cut endangered and indigenous tree species namely Abash Tid (Juniperus procera, Wanza (Cordia africana), and Weira (Olia africana which are mainly found in the Yabelo state forest Between km 80 and 90 of the project road. The project should prepare a forest management plan before the cutting takes place to manage the forestry/reforestation process in Yabelo State Forest.

- The contractor shall aware construction work force to not cut tree for any purpose without prior approval of Environmental supervisor and Local Forestry Department
- The contractor shall plant at least 10 new seedlings for each indigenous tree to be affected and water them until the local forester approves that they grow independently
- The contractor shall save big trees located on roadside by shifting the centerline of the road to the other side, in campsites, and also in material sites.
- The contractor shall take photographs of these sites before starting clearing and keep it as an official document in a separate folder.
- The contractor shall forbid his workforces from deliberately and discriminate cutting down trees, involving in any trade activities or illegally transporting forest products. The contractor shall take the responsibility for his misbehavior of workforces and involvement in any trade activities by his workforces or transporting of any forest products by construction vehicles

10.9 Impact on Fauna

Though there are no protected wildlife conservation areas along the project road, some impacts during the construction phase on the available wildlife would be expected in relation to destruction of habitats/vegetation in the right-of-way and at quarries and borrow pits as well as increased traffic volume and noise pollution will disturb the wild animals adapted to use these habitats. These may cause migration of the animals away from the road and disruption of their movement patterns. Mortality rate also will likely increase because of collisions with vehicles. To minimize road construction impact on wild life the following mitigation measures should be done by the construction contractor:

- The Contractor shall forbid his workforces from deliberately killing wild animals, hunting wild animals for food or sport purposes, involving in any trade activities of dead or alive wild animals
- The Contractor shall maintain road side forest that may serve as wild life habitat and corridor

- The Contractor shall abstain from encroaching into areas of wildlife habitats and other sensitive areas
- The contractor shall install warning signs and posters on wildlife corridors, particularly between Segen river and Brindar kebele and between Brindar and Elwoya kebeles
- The Contractor shall restore affected areas (e.g. quarries and borrow pits and access roads to those sites) through replanting program.
- The Contractor shall install warning signs and speed control measures at animal crossing sites
- The Contractor shall create awareness among drivers to give priority for road crossing animals and abstain from running after them or chasing the animals away
- The Contractor shall aware drivers to put off light and give priority for road crossing nocturnal animals during the night time

10.10 Traffic Management Plan (TMP)

Contractor shall prepare Traffic Management Plan (TMP) that suits construction works for the entire or sections of the road project. The TMP shall be prepared using or based on the new ERA (EMSB) Road Safety Audit Manual and submit to RE and ERA's EMSB for reviewing and approval before the construction work commences

- The Contractor shall provide diversions with suitable and reflecting road signs; provide barricades and delineators and flagmen to guide the traffic. For regulation of traffic, the flagmen shall be equipped with red and green flags
- Provide alternative pedestrian routes where these are interrupted
- The Design Engineer shall consult the local people as to where to construct the different engineering facilities like parking bays, foot paths
- The Contractor shall use clear, leveled properly and meaning full traffic signs and speed limits, especially at road crossing of the people and conjunction of animals
- The Contractor shall provide traffic awareness, especially at schools, churches and other places at certain period of construction time and introduce accident prevention methods
- The Design Engineer shall identify all high traffic accident areas and safety measures shall be proposed at all these areas.

10.11 Impact on Farmland

Farmland would be taken for various activities of the road construction. However, the magnitude of impact on farm land would vary depending on how the road construction Contractor manages its work and working environment. Careless disposal of spoils and construction wastes on farmland and unlimited use of detour and access roads could exacerbate adverse impacts of road construction on farm land. Therefore, the Contractor shall implement the following measures but not limited to:

- The contractor shall abstain from locating campsites, quarries and borrow pits on fertile farmland, instead locate them in less productive areas

- The contractor shall not establish diversion roads in productive farmland and shall limit the diversions within the Road Right of Way
- The Contractor shall abstain from dumping any spoil from construction activities into farmland unless requested to do so by the farmers.
- The Contractor shall separate topsoil from subsoil and preserve top soils for later use
- The Contractor shall reinstate all the farmland temporarily taken for various activities of road construction. Reinstatement shall include stockpiling the top soils, removing any concretes or foreign materials, loosening the compacted soils, landscaping/leveling/shaping, spreading the topsoil uniformly over the surface. The level of reinstatement shall be approved by the RE and Environmental supervisor as well as it should satisfy the land holders.

10.12 Health Impact

From the viewpoint of public health, the construction crews and the campsite areas are the main concern particularly in relation to the expansion of HIV/AIDS, STD and Malaria. To minimize these health problems the contractor or construction activities shall:

- Be aware that the road traverse through malaria endemic areas and be prepared to avoid possible health risk through environmental health and hygiene management of camp sites and availing clinic, chemically treated mosquito nets and medicines for the work force
- The Contractor shall not induce malaria outbreak by creating temporary & permanent water holding areas which favor mosquito breeding
- The Contractor shall restore borrow pits and quarry areas to avoid breeding sites for mosquito
- The Contractor shall provide clinics with all necessary medications in major construction camps, and First Aid kits at all working sites
- The Contractor shall minimize dust emission by watering the road during construction at the settlement areas at least 3 times a day (in the morning, before lunch time and before the end of working hour)
- The Contractor shall take care when selecting campsites in such a way that it should not invite close interaction with local community.
- The Contractor shall provide safe water supply & appropriate waste disposal facilities including the provision of sanitary latrines in the construction camp
- The Contractor shall provide health education mainly focusing on the HIV/AIDS control and prevention, avoid discrimination in work places due to HIV/AIDS and provide counseling service. This activity shall be executed as a sub contract by local NGOs and relevant institution
- The Contractor shall provide free counseling and distribute condoms & leaflets to workforce and vulnerable group of nearby communities
- Due precautions shall be taken by the contractor to ensure the safety of his staff and labor in collaboration with the local health office by providing medical staff; first aid equipment and stores, sick bay and suitable ambulance service at the camps, housing, and on the site at all times throughout the period of the contract

10.13 Impacts related to occupational safety

During the road construction, there will be more occupational health problems associated with construction activities such as accidents from traffic or working machines, explosives, etc. To minimize these inconvenient working conditions and safety problems the following clauses shall be included in the contract document**:**

- The contractor must ensure that the potential danger to the public (including pedestrians, all road users. and adjacent building owners and occupiers) is kept to an absolute minimum. All work sites are to be clearly sign posted and fenced, and if necessary lit at night. Safe, traffic control arrangements to provide well-signed pedestrian routes to be provided to avoid construction accidents
- During the execution of the works the contractor shall keep the site reasonably free from all unnecessary obstruction and shall store or dispose of any contractor's equipment and surplus materials and clear away and remove from the site any wreckage, rubbish or temporary works no longer required.
- Where the contractor is authorized to use explosives required for rock excavation, the explosives shall be stored, handle, and used with the utmost caution and strictly in accordance with the statutory government regulations. The contractor shall be responsible for the presentation of any unauthorized issue or improper use of any explosive and shall ensure that the handling of explosive shall be entrusted only to experienced and responsible men.
- All open excavations shall be adequately barricaded to prevent workmen or others from accidentally falling into them. Any open excavation in the road carriageway or shoulder areas shall in addition be marked at night with white painted drums (or similar) and red or amber lighted lamps, to the satisfaction of the engineer.
- Explosives and chemicals should be stored under proper security at a safe distance from the road and any inhabited premises
- Give warning each time of his intention to blast and should station personnel on the roads and elsewhere with flags, horns and whistles and prevent persons , animals and traffic entering danger zone
- Provide education to personnel of the contractor about safety procedures and emergency response plans associated with their task.
- The contractor shall provide accommodation and amenities as it may be necessary for all his staff and labor including all fencing, water supply (both for drinking and other purposes), electricity supply, sanitation, cookhouses, fire prevention and fire-fighting equipment, air conditioning, cookers, refrigerator, furniture, and other requirements.
- The contractor shall make any necessary arrangements for the transport, to any place as required for burial, of any of his expatriate employees or members of their families who may die in Ethiopia.
- The contractor shall arrange for the provision of a sufficient supply of suitable food at reasonable price for all his staff, labor, and subcontractors for the purposes of or in connection with the contract.
- Alcoholic liquor or drugs are strictly forbidden to use in whatever means.

- The contractor shall pay compensation according to the laws of the country … for loss or damage suffered in consequence of any accident or injury or disease resulting from his work for any workman or other person in the employment of the contractor or any subcontractor.

10.14 Disruption of Crossing Structures, Access Roads and other Services

- The design Engineer shall not propose fill sections in towns and rural villages
- The contractor shall provide different crossing structures or access roads to individual houses on upslope and social facilities
- The contractor shall not use market places for permanent or temporary storage of construction materials
- The contractor shall not block water pipes
- The contractor shall not disrupt electric and telephone lines
- The contractor shall not operate noisy operations near schools and religious places

10.15 Grassing of Cut Slops and Bare grounds

Road construction works, which involves cutting and filling, will most likely induce slope instability, bare ground and soil erosion problems. Therefore, the contractor shall:

- Implement Bioengineering techniques such as planting locally accepted varieties of grass species together with physical engineering measures as soon as possible after completion of the works.
- Apply grassing on erosion prone slopes of high embankments and fill areas, toes and banks of the streams to avoid/restrict erosion, and water them until the grasses and trees are survived independently

10.16 Archaeological, Cultural and Religious Resources

Concerning cultural and religious resources there are Konso traditional terraces and few gravesites along the sides of the proposed road alignment, which require attention during the road design and construction. In addition, Religious, Cultural and Historic resources that were not identified during the field assessment may become apparent during excavation. Therefore, the contractor shall:

- Provide brief training for equipment operators and construction personnel on discovery of artifacts and the need to report any discoveries to the relevant authority.
- Redesign the road section to avoid impacts on burial places
- If in case archeologically important phenomenon appear during road construction, suspend the work and report to the nearby authority or tourism bureau
- Whenever there is an indication of archaeological or historical events arrange for inspection by experts,

10.17 Before Commissioning

The construction contractor shall clean up the project environment before officially handover the project. The social and environmental supervisors and EMSB of ERA should follow up the proper implementation of these activities and check that the work as built meets all

significant environmental requirements before the project is officially accepted and should report to the concerning parties

- All the salvages and waste materials from the construction process should be cleaned, demolished or dumped in appropriate and authorized places.
- Quarry and borrow areas should be reinstated, drained and planted trees.
- Temporary camp sites should be removed and the compacted materials should be removed and reinstated so that the land continues giving services which were discontinued due to the project.
- The client should hold certain amount of money until the completion of the cleaning activities approved by social and environmental supervisors.

10.18 Others

- The contractor should give job opportunity for the local people as much as possible, giving priority for the affected people and women
- Take responsibility to create awareness among the work force about the protection of natural environment, maintaining of vegetation and wild life, keeping water sources clean etc.
- Work agreed with the environmental supervisor and site engineer in implementing the socio-environmental mitigation measures specified in the SEIA report
- The construction contractor shall also present management plan for:
  - ✓ Camp site construction and management
  - ✓ Water resource use plan for construction
  - ✓ Query and borrow site management and rehabilitation plan
  - ✓ Health and risk management plan including HIV alleviation program
  - ✓ Dust and pollution control and management plan
  - ✓ Blasting and crashing plant management plan
  - ✓ Clearing up plan after the completion of the construction work
- It is a paramount important and mandatory by contractor and environmental supervisor to check first weather all the mitigation measures have been addressed, and second new emerging environmental issues have been treated and thirdly monitoring and reporting of the outcomes and discrepancy (if any)of EMP to ERA from ESIA report

10.19 Contractual agreement

Usually implementation of ESIA through mitigation and monitoring are not done or are considered less important than the engineering specifications. It is necessary that a follow up is done and clearance to the contractor provided only when Environmental mitigation measures are completed as per the ESIA and Monitoring findings and recommendations. Payment of any performance should also include performance in mitigating adverse impacts during construction as well as decommissioning and rehabilitation phases

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 Conclusions

Based on over all analysis and synthesis of the study findings it is concluded that the upgrading and operation of the Konso - Yabelo road will bring a variety of benefits at both local and national level. In particular, the impact at local level is increasing the reliability of road transport and the potential to develop the local economy through improved infrastructure and employment opportunities will be significant. The road will also create alternative route to Addis - Moyale road and promote easy transportation of import and export goods between Ethiopia and Kenya and attract tourists to Konso, Omo valley and Chew Bahir areas which are rich in wildlife and different cultures.

On the other hand, the proposed project activities will bring some negative impacts to the natural and social environment. Many of these impacts will be short-term and reversible in nature, but some will be permanent impacts. The potential significant impacts will include soil erosion, slope destabilization, siltation, ecological disturbances (deforestation and disruption of wildlife), spreading of communicable diseases, and disturbance to local people.

The widening of the road will also affect some houses situated in the Right of way, particularly at Elwoya town. However, these impacts can be reduced to acceptable levels with normal good engineering practice coupled with integrating the environmental and social mitigation measures into the planning and implementation schedule of the road development. Particularly reducing ROW to 30 m at Elwoya town would reduce the impact of the road on settlement and minimize the cost of compensation. It can therefore be concluded that there are no severe or impacts that cannot be mitigated to prevent the implementation of the road upgrading project.

11.2 Recommendations

To maximize the efficiency of the road project and reduce the magnitude of the unwanted effects to acceptable levels, it is essential that the proposed mitigation measures are applied at the right time through the environmental management plan, and by incorporating the relevant ones in the engineering design for implementation. A close follow-up of the effectiveness of the implemented measures through a well-planned monitoring programme is also of critical importance. Among the issues that should be given maximum attention are:

- Erosion control measures must be designed and implemented throughout the project areas where required, and a follow-up instituted to rehabilitate failures.
- Maximum attention must be given to the design and construction of the section between Km 10-km 16 and Km 80-90 to secure the stability of the adjacent slopes; the most vulnerable slopes should also be protected with retaining structures.
- Effective storm water management systems and structures must be put in place throughout the project areas, with greatest attention given to sections Km 16 and Km 54 (Masgerdo River).
- Impacts on water sources of the local communities and their animals must be kept minimal as far as possible.
- Appropriate traffic signs should be installed at cattle crossings.

- Application of good practices during the road construction, including collection and hauling of water and selected materials to minimize unwanted impacts on the environment.
- Restricting land acquisition to what is absolutely necessary to reduce loss of land and vegetation/forest.
- Proper siting of construction camps and management of work force, and restoration of the sites as per the surrounding environment as soon as the construction work is completed.
- Proper management of construction machinery and control of traffic.
- The project road connects various different ethnic societies and tribal communities within a given ethnic group. There are, consequently, multiple and diversified social customs, norms and values. The planning, implementation and monitoring of the anticipated socioeconomic impact mitigation management, therefore, requires respect and recognition of the local people and their beliefs, norms and values. Hence, active and whole-hearted involvement of the local community leadership and opinion-makers is at all stages of paramount importance.
- Maintaining 40 m ROW would result in a high cost of compensation as it affects several houses at Elawoya town. Therefore, it is recommendable to minimize ROW to 30 m or less, particularly at Elwoya town.
- SEIA revealed that the number of project affected people (PAPs) who are expected to lose their houses in Konso and Teltele woredas are below 200, while number of PAPs in Yabelo Woreda is estimated to be more than 200. However by incorporating the appropriate mitigation measures in the design of the road, the impact would be reduced to the minimum. Some of the proposed mitigation measures to reduce adverse impact of the road construction on settlement areas, particularly at Elwoya town of Yabelo Woreda are reducing the right of way to 30 m or less and shifting the centerline of the road towards left side where few houses would be demolished as it compared to right side. But to take the appropriate mitigation, preparation of the RAP is of paramount importance if there are PAPs, which will be decided once the land acquisition study is completed.

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ANNEX 1

Annex 1a: List of participants of community consultation Konso - Yabelo road, 2009

Annex 1b: List of Woreda Authorities Consulted at Konso, Yabelo and Teltele woredas, 2009

Annex 1a: list of participants of community consultation Konso - Yabelo road, 2009

No.	Name	Sex	Responsibilities	Address	
				Woreda	Kebele
1	Masule Gulecha	F	Resident	Teltele	Brindar
2	Kedir Mohamed	M	Resident	Teltele	Brindar
3	Diba Wariyo	M	Resident	Teltele	Brindar
4	Dika Wake	M	Resident	Teltele	Brindar
5	Guyato Kolu	F	Resident	Teltele	Brindar
6	Kebabo Chaltesa	F	Resident	Teltele	Brindar
7	Bokayo Omore	F	Resident	Teltele	Brindar
8	Kate Jeltesa	F	Resident	Teltele	Brindar
9	Gilo Tita	F	Resident	Teltele	Brindar
10	Taji Wato	F	Resident	Teltele	Brindar
11	Hussen Mohamod	M	Resident	Teltele	Brindar
12	Teramu Boru	F	Resident	Teltele	Brindar
13	Kalma Kadoto	M	Resident	Teltele	Brindar
14	Jeltaha Boru	M	Resident and elder	Teltele	Brindar
15	Girma Kenchoro	M	Resident and elder	Teltele	Brindar
16	Kobu Guyamile	M	Resident and elder	Teltele	Brindar
17	Totaa Hanashe	M	Resident and elder	Teltele	Brindar
18	Guyo Godana	M	Resident and elder	Teltele	Brindar
19	Kalem kaya	M	Resident and elder	Teltele	Brindar
20	Bene Guyawo	M	Resident and elder	Teltele	Brindar
21	Melo Hide	M	Head of the Kebele administration	Teltele	Brindar
22	Baden Sora	M	D/head of Kebele	Teltele	Brindar
23	Girma Wako	M	Speaker of the house	Teltele	Brindar
24	Talicha Abdiya	M	Resident and elder	Teltele	Brindar
25	Kelicha Kenchiro	M	Resident and elder	Teltele	Brindar
26	Sora Dido	M	Resident and elder	Teltele	Brindar

Annex 1b: List of Woreda Authorities Consulted at Konso, Yabelo and Teltele woredas, 2009

No.	Name	Sex	Responsibilities	Address
1	Gelebo Golitomo	M	Head of chief administrator	Konso Special woreda
2	Hemer Hansha	M	Head of capacity building	Konso Special woreda
3	Gachira Emani	M	Head of health office	Konso Special woreda
4	Samuel Gelebo	M	Head of youth and sport office	Konso Special woreda
5	W/ro Birke Galsismo	F	Head of women affair office	Konso Special woreda
6	Kefene Tcharo	M	Head of Agriculture and Rural development office	Konso Special woreda
7	Habtamu Gillo	M	Head of Culture and Information office	Konso Special woreda
8	Eareke Geyato	M	Spokesperson	Konso Special woreda
9	Guyo Wariyo	M	D/head of the Woreda	Teltele Woreda
10	Kassaye Bedassa	M	D/head of information and communication	Teltele Woreda
11	Getu Sisay	M	Head of Youth and sport office	Teltele Woreda
12	Muzi Shubisa	M	Head of Health office	Teltele Woreda
13	Tilahun Amare	M	Vice head of pastoralist office	Teltele Woreda
14	Boru Katete	M	Expert	Teltele Woreda
15	Galma Boru	M	Head of chief administrator	Yabelo Woreda
16	Solomon Mamo	M	Spokesperson	Yabelo Woreda
17	Metem Mengu	M	Head of information office	Yabelo Woreda
18	Did Boru	M	Head of security	Yabelo Woreda
19	W/ro Asha Sora	M	Head of Health office	Yabelo Woreda
20	Endale Habte	M	D/head of pastoralist office	Yabelo Woreda

ANNEX 2

Minutes of meetings with Woreda officials and heads of sector offices along the project road and Signatures of PAPS

Date JULY 6/2009

Minutes of meeting

Place of meeting: Konso Special Woreda at the Administrator office

List of participants

No.	Name.		occupation/position	Signature.
1	Ato	Gelebo	Golitomo	Head of Chief Administrator
2	"	Homer	Hansha	Head of Capacity Building
3	"	Gachira	Emani	Head of Health office
4	"	Samuel	Gelebo	Head of Youth & sport office
5	W/ro	Birke	Golitomo	Women affair office
6	Ato	Kefene	Tcharo	Agriculture & Rural Dev.
7	"	Habtamu	Gillo	Head of culture & Information
8	"	Eshete	Geyato	Speaker of the House
9	"	Hirsyto	Gofe	Justice and Security head
10	"	Abebe	Abaja	Sociologist Sociologist
11	—	Zeleke	Chefamo	Project Environmentalist

Agend of the Discussion: Discussion on the socio-environmental impacts of the Konso-Yabelo road construction and the attitude of the Woreda Administrators and elets towards the road projects

We the participants of the meeting discussed on the overall impacts and benefits of the proposed road construction. The main adverse impacts would be only temporary such as loss of few farm land, vegetation, soil erosion, and distruction of some houses situated in the road right of way. But the benefit will be by far more than adverse impacts. It will connect with Oromia region and then to

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other African Countries. It will directly connect Konso with Mombasa port. This will create important condition to promote trade and tourism and will bring socio-economic development. The road will also shorten the distance travel to the regional center, Awasa. It also connects with Guji zone and will create job opportunity to the young people. The road will also connect with Yabelo.

- The future plan which is to make the train control station at Konso will be one of the benefit to the construct the proposed road.
- The overall benefit of the project road is by far more important.

To mitigate the expected temporary impacts, it will be important to work in a coordinated manner. Tree loss will be mitigated by planting 2 or more trees to substitute a single tree lost. The loss of house will be compensated according to the law of compensation. In general, the adverse impacts are all mitigable and temporary.

Finally we agreed to support the construction of this project road as far as we can. We also like to ask the Government to speed up the planned road construction.

Eoreke Geyeto
Kefene Tichoro
Guchita Eimeru
Homes Hanshe
Habtamu Gillo
Birke Glismo
Abebe Abate
Belebi Coltomo

SNNPRG, Konso Special Wereda Administrative Office

1

Date July 6 /2009

Minutes of meeting

Place of meeting: Taltele Woreda Administration office

List of participants:

1 Ato Guyo Wariyo D/ Head of the Woreda
2. Ato Kassaye Bedassa D/ information & cominication
3 Ato Muzi Shubisa Wored Health office head
4 Ato Getu Sisay Youth and sport office
5 — Tilahun Amare Vice head of pastoralist office
6 Ato Boru Katete Wored peace office experte
7 Ato Abebe Abeta Project sociologist
8 Ato Teleke Chafano Project environmentalist

Agenda: Discussion on the socio-environmental impact of the Konso-Yabelo road construction Project.

We the above listed representatives of the Woreda have been discused on the socio-environmental impacts of the Project. We found that the project will not cause significant adverse impacts. But the project will provide many of positive impacts. The road will provide:

- It connects the woreda with zonal capital, Yabelo.
- Due to lack of Bridge along the road the existing road is not accessible and we cannot get access to the zone. Therefore, construction of the road will solve this problem.
- The road will creats trade access with Konso and Yabelo
- The Woreda is well known for teff, goats and cattle production. The improved road will creat better access to market. It will promot tourism to the area.
- There is an endemic ASS which is found only in Afar and Sarit kebele of Taltele, which can attract tourists to the area.

It will also creat conducive environment for security

- Livestock products will get better market.
- The construction of the road will not cause any significant impacts. The only thing we feel is that the road is not going to pass through the Woreda town, Taltele. If there is possibility to pass the road through Taltele town, it would provide more benefit for the Woreda. If the road construction extended to Taltele it will create short cut to the Chelbi and Chew Bahir which is the known tourist attraction. There are also mineral potential in the area. The area is well known for variety of wildlife, hot springs and landscape.

The only adverse impacts are loss of few vegetation cover and loss of few houses. These impacts are of temporary nature. These can be easily mitigated by doing in coordination with government and affected people.

July 8/2009

Minutes of meeting.

Place of meeting: Yabelo Woreda Administrator office Yabelo

List of participants

No.	Name	occupation/position
1	Ato Galma Boru	Head of the Yabelo Woreda Administration
2	Solomon Maino	House of Speaker
3	Metem Mengu	Head of information office
4	Did Boru	Head of security
5	W/ro Asha Sora	Head of health office
6	Ato Endale Habite	D/Head of Woreda Pasteralist office
7	Ato Abeke Abeta	project sociologist
8	" Zeleke Chafamo	Project environmentalist

Agenda of meeting: Discussion on socio-environmental impact of the Konso-Yabelo road construction project.

We the Yabelo Woreda Administration officers, heads of sectoral offices and representatives of the public have discussed on the overall socio-environmental impacts of the Konso-Yabelo road construction. We found that the construction of the road is highly important to the area. The benefit is unquestionable. The adverse impacts will be very minor and temporary. These impacts will be mitigated easily by adopting appropriate mitigation measures. We know that the construction

of this road will affect few house at Elawoya kebele.. This impact can be mitigated by paying appropriate compensation in accordance to the law of the country. .

In general, the positive impact of the road construction will provide much benefit such as improve trade with other areas like Konso, attracts tourists, creat job opportunities and facilitate trade and transportation. etc.. By realizing these benefits, we agreed to support the project in every aspect as far as we can. We are esegly waiting the implementation of the project and we request the concernig bodies to speed up the implementation of the project.

Abebe Abate
Endale Habte
Galma Boru
Goloden Momo
Sorca
Dida Boru
Fatema Mamgo

Mootummaa Naannoo Oromiyaa
Booranaatti Waajjira Bulchiinsa Godina
Aanaa Yaabelloo

ANNEX 3

Checklist for Baseline Data Collection

I. Physical Environment

Physiography

- Catchment characteristics,
- Drainage pattern,
- Topography, etc.

Climate:

- Rainfall,
- Temperature,
- Humidity,
- Evapotranspiration.

Hydrology:

- Water bodies,
- Water use (existing & potential), etc.

Soils:

- Soil types,
- Rate of erosion, etc.

Geology:

- Type of geological formation and rocks,
- Stability condition, etc.

II. Biological Environment

Ecosystems:

- Types of ecosystems and functions;

Vegetation:

- Floristic composition;
- Species richness;
- Endemicity; etc.
- Characteristics of the plant cover:
- Types of communities, sensitive, endangered or unique communities, etc.
- Particular threats: bush or forest fires

Wildlife:

- Wildlife biodiversity:

- Wildlife composition;
- Species richness; endemicity; etc.
- Particular threats: bush or forest fires.

III. Human Environment

Social Environment

- Population size,
- Age and sex composition,
- Density,
- Ethnic groups,
- languages,
- literacy & education,
- Geographic distribution, etc.

Gender:

- Socio-cultural norms regarding the gender division of labour,
- Rights and responsibilities,
- Access to and control over resources.

Health:

- Common diseases,
- Communicable diseases,
- Health facilities & personnel,
- % of pop. accessible to health services,
- Water supply and sanitation situation.

Societal Framework:

- Government institutions and administrative structures.

Cultural Environment

Cultural Heritage:

- Sites of cultural,
- Historical,
- Archaeological and,
- Religious value.

Economic Environment

- Major economic activities: regional, local levels.

- Primary sector activities: agricultural production (major crops, production system, markets, etc.), animal husbandry, mine production, etc.

Infrastructures and Services

- Communications,
- Transportation,
- Water supply & sanitation,
- Health services and,
- Educational services

Land Use Patterns

- Current and future uses of land
- Land carrying capacity
- Development land policies, plans, zoning
- Traditional land use management practices

ANNEX 4

Initial Environmental Examination

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

Initial Environmental Examination (IEE) represents the earliest stage in formal environmental impact assessment, which itself is a process for identifying and evaluating the ways in which a proposed project is likely to affect its environment. At the outset of the study, environmental screening was carried out for the road project in accordance with environmental impact assessment (EIA) laws and EIA guideline document of Ethiopia and the African Development Bank (ADB) IEE checklists. The main purpose of the screening is to ensure that the road project is subject to the appropriate extent and type of environmental assessment.

As per the ADB IEE Checklist, road schemes would fall into either ADB Environmental Category I or II type projects. More specifically, Road Construction would fall into Category I and Road Rehabilitation into Category II. However, if a category II project is located in or close to *environmentally sensitive areas* it should be treated as equivalent to category I projects. In the checklist, however, there is no mention about 'Road Upgrading'. ADF Environmental Checklist was completed for the road project to assess under which category the project will fall (see below).

No.	Question	True or False
1	The project is not located in or close to an environmentally sensitive area	False
2	The project is listed under Category II of Figure 1 (IEE Checklist) of the ADB Environmental Assessment Guidelines	True
3	The project has no major physical interventions in the human and natural environment	False
4	The project is a small-scale project	False
5	The project is a low-cost project	False

According to the EIA Guideline Document of Ethiopia (prepared by the Environmental Protection Authority (EPA)) *Rural Road Programmers* would fall into *Schedule 1* and *Major Rural Road Upgrading/Rehabilitation* fall into *Schedule 2*. However, all projects located in environmentally sensitive areas should be treated as equivalent to Schedule 1 activities irrespective of the nature of the project.

Schedule 1: Projects which may have adverse and significant environmental impacts, and may, therefore, require full EIA.

Schedule 2: Projects whose type, scale or other relevant characteristics have potential to cause some significant environmental impacts but are not likely to warrant an environmental impact study.

In the Environmental Guideline (*Standard Environmental Methodologies and Procedures Manual*) produced by ERA, New/Upgrading of Major Roads and Regional Roads would require a full EIA, and Rehabilitation of Roads would warrant Initial Environmental Impact Assessment.

After all these screening with the relevant guidelines, it is understood by the Consultant that the environmental assessment process for the Konso - Yabelo Road Project to be adopted is Category I of the ADB Guideline, or Schedule 1 of the EPA EIA Guideline, i.e. the road project would require a full EIA. Concerning the relevance to environmentally sensitive areas, the project road is located in some areas categorized as *environmentally sensitive areas* in both the ADB IEE Checklist and the EPA Guideline. Among the *environmentally sensitive areas* listed in the guidelines, *areas with erosion-prone soils and areas prone to desertification* are the most relevant to the proposed road project.

ANNEX 5

Criteria for Rating Impacts

Criteria for Rating Impacts

Category	Scale/Type	Criteria
Type of Impacts	Positive	Desirable effects/changes to the environment (physical and/or socio-economic environment)
	Negative	Undesirable effects/changes to the environment
Nature of Impacts	Direct	Impacts which are caused by the road itself, i.e. the physical planning and building of the infrastructure and other activities directly related to the road works
	Indirect	Impacts linked clearly with the road project, and may have more profound long-term consequences
	Cumulative	Impacts resulting from multiple interrelated events, or incremental or widespread change. These can generate addition, multiplicative or synergetic effects, which can result in more severe or significant damage to the environment.
Duration of Impacts	Short-term	Quickly reversible impacts; less than the project lifespan.
	Medium-term	Impacts reversible over time, which could be within the lifespan of the project or within 5-15 years.
	Long-term	Permanent impacts which may arise during construction, but their influence continues throughout the operation phase.
Spatial Scale of Impacts	Local	Impacts limited to the site boundary or the immediate vicinity of the road.
	Widespread/ Extensive	Impacts that can occur many kilometers from the project, which can be at regional, national or international scale.
Severity of Impacts Impact Magnitude and Significance	Low	Impacts occurring in degraded areas, which have little conservation value; minor change in special occurrence or variety
	Medium	Disturbance of areas that have potential conservation value or area of use as resources.
	High	Disturbance of pristine areas that have important conservation value; destruction of rare or endangered species.
	Non-significant	Disturbance of pristine areas that have important conservation value; destruction of rare or endangered species.
	Low	Impact that is likely to have little real effect, and mitigation is either easily achieved or little will be required or both.

Category	Scale/Type	Criteria
	Medium	Impact is real, but not substantial in relation to the impacts that might take effect within the bounds of those that could occur. Mitigation is both feasible and fairly easily possible. Modification of the project design or alternative action may be required.
	High	Of the highest order possible within the bounds of impacts that could occur. Mitigation to offset the impact is difficult, expensive, time consuming, highly costly or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these may come to a halt.

ANNEX 6

List of some threatened endemic plant species of Ethiopia in Acacia-Commiphora Woodland

List of some threatened endemic plant species of Ethiopia in Acacia-Commiphora Woodland

Geographical Areas (based on former administrative regions):

AR = Arsi; BA = Bale; GD = Gonder; GG = Gamo Gofa; GJ = Gojam; HA = Hararge;

IL = Ilubabor; KF = Kefa; SD = Sidamo; SU = Shewa Upland; TU = Tigray Upland;

WG = Welega; WU = Wello Upland.

Status: E = endangered; Ex = extinct; R = rare; V = vulnerable

Species	**Family**	**Distribution**	**Status**	**Habit (Type)**
Acacia pseudonigriscens Brenan and Ross	Fabaceae	BA; ca. 300 m	E	Small tree
Aeschynomene ruspoliana Taub. & Harms	Fabaceae	SD; not recorded	E	Shrub or herb
Andrachne ephemera M. Gilbert	Euphorbiaceae	HA BA SD; 1000-1600m	V	Herb
Commiphora monoica Vollesen	Burseraceae	BA; 1250-1400m	E	Herb
Crotalaria awasensis Thulin	Fabaceae	SU SD; ca. 1700m	E	Herb
C. boundettii Polhill	Fabaceae	HA; 550m	E	Herb
C. heterotricha Polhill	Fabaceae	HA; ca. 500m	E	Herb
C. hypargyria Chiov.	Fabaceae	BA; not recorded	E	Herb
C. jijigensis Thulin	Fabaceae	HA; 1750-1850 m	E	Suffrutescent
C. ruspoliana Chiov.	Fabaceae	SD; not recorded	E	Herb
C. trifoliolata Bak. f.	Fabaceae	BA; ca. 1400m	E	Herb
Cyphostemma burger Vollesen	Vitaceae	HA; 1500-1800m	E	Herb
Erythrococca uniflora M. Gilbert	Euphorbiaceae	SD; 950-1325 m	E	Shrub
Erythrophysa septentrionalis Verdc.	Sapindaceae	HA; 600-800m	E	Shrub/small tree
Euphorbia awashensis M. Gilbert	Euphorbiaceae	SU; ca. 1000m	E	Pyrophyte
E. baleënsis M. Gilbert	Euphorbiaceae	BA; 1150-1450 m	E	Shrub
E. betulicortex M. Gilbert	Euphorbiaceae	SD; ca. 950 m	E	Small tree
E. burgeri M. Gilbert	Euphorbiaceae	HA; 1200-1550 m	E	Succulent shrub

Species	Family	Distribution	Status	Habit (Type)
E. cryptocaulis M. Gilbert	Euphorbiaceae	SD; 1350-1600m	E	Geophyte
E. dalettiensis M. Gilbert	Euphorbiaceae	HA; ca. 1200 m	E	Succulent shrub
E. ellenbeckil Pax	Euphorbiaceae	SD; 1000-1100 m	E	Succulent shrub
E. fissispina Bally & Carter	Euphorbiaceae	SD; ca. 750 m	E	Shrub
E. Gymnocalycioides M. Gilbert & Carter	Euphorbiaceae	SD; ca. 1350 m	E	Succulent
E. monacantha Pax	Euphorbiaceae	SD; BA; 1200-1800 m	V	Succulent
E. nigrispinioides M. Gilbert	Euphorbiaceae	SU; 1000-1700m	V	Shrub/small tree
E. omariana M. Gilbert	Euphorbiaceae	BA; 1350-1400 m	E	Herb
E. piscidermis M. Gilber	Euphorbiaceae	HA; 1000-1050 m	E	Succulent
E. sebsebei M. Gilbert	Euphorbiaceae	SD; 1300-1450 m	E	Succulent
E. somalensis Pax	Euphorbiaceae	HA; ca. 1100 m	E	Shrub/small tree
E. tetracantha Randle	Euphorbiaceae	BA; ca. 600 m	E	Suffrutescent
E. uniglans M. Gilbert	Euphorbiaceae	SD; ca. 1400 m	E	Small tree
Galega somalensis (Taub. ex Harms) Gillett	Fabaceae	SD; ca. 1600 m	E	Suffrutescent
Indigofera cana Thulin	Fabaceae	WU; 1200-1800 m	E	Suffrutescent
I. curvirostrata Thulin	Fabaceae	SD; ca. 900 m	E	Shrub
I. ellenbeckil Bak. f.	Fabaceae	HA; not recorded	E	Suffrutescent
Jatropha horizontalis M. Gilbert	Euphorbiaceae	SD; 1250-1500m	E	Suffrutescent
Lotus Ialambensis Schweinf.	Fabaceae	HA; 1200-200m	V	Herb
Phragmanthera erythraea (Sprague) M. Gilbert	Loranthaceae	TU SU; 1150-2200m	R	Semiparasite
Phyllanthus borenensis M. Gilbert	Euphotbiaceae	SD; ca. 1100 m	E	Shrub

Species	Family	Distribution	Status	Habit (Type)
Plicosepalus robustus Wiens & Polhill	Loranthaceae	SD; ca. 1600m	E	Semiparasite
Rhynchosia erythraeae Schweinf.	Fabaceae	SU; 1000-2000m	E	Shrub
R. malacotricha Harms.	Fabaceae	SU HA BA; 1350-2000m	V	Shrub
R. ramose Verdc.	Fabaceae	HA; ca. 900 m	E	V Herb
Taverniera schimperi Jaub. & Spach.	Fabaceae	TU SU; 1000-1300m	V	V Herb

Source: SOME THREATENED ENDEMIC PLANTS OF ETHIOPIA, Ensermu Kelbessa, Sebsebe Demissew, Zerihun Woldu and Sue Edwards. In: Botany 2000: East and Central Africa. NAPRECA

Monograph 2: 35-52, 1992.

ANNEX 7

Plant Species Appropriate for Replanting/Restoration Program

Plant Species Appropriate for Replanting/Restoration Program

No	Scientific Name	Common Name	Type
1	Azadirachta indica	Neem	Tree (exotic)
2	Moringa oleifera	Cabbage tree	Tree
3	Conniphora africana	Anga (Am)	S. Tree /Shrub
4	Commiphora habessinica	Chalanga (Or.)	S. Tree /Shrub
5	Leucaena leucocephala	Lukina (Am)	S. Tree
6	Cordia sp.	Chew Wanza (AM)	S.Tree (Ind.)
7	Terminalia sp.	Woybata (Kon.)	Tree (Ind.)
8	Commiphora terebinthina		S.Tree (Ind.)
9	*Juniperus procera*	Juniper	Big Tree
10	Schinus molle		Tree (exotic)
11	Cynodon dactylon	Serdo (Am.), Chekorsa (Or.)	Grass
12	Cynodon aethiopicus		Grass
13	Vetiveria Zizanioides	Vetiver Grass	Grass
14	Cenchrus ciliaris	Buffel Grass	Grass
15	*Eleusine floccifolia*		Grass
16	Panicum sp.		Grass
17	Setaria sp.		Grass
18	*Sporobolus spicata*		Grass

ANNEX 8

Federal Negarit Gazeta